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*Project*

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366p.

DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
Washington, D.C. 20523

PROJECT PAPER

Proposal and Recommendations  
For the Review of the  
Development Loan Committee

PANAMA - INTEGRATED RURAL DEVELOPMENT

AID-DLC/P-2248

UNCLASSIFIED

DEPARTMENT OF STATE  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20521

UNCLASSIFIED

AID-DLC/P-2248

September 12, 1977

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Panama - Integrated Rural Development

Attached for your review are recommendations for authorization of a loan to the Government of Panama ("Borrower") in an amount not to exceed Nine Million Seven Hundred Thousand United States Dollars (\$9,700,000) to assist in financing the United States dollar and local costs of a project to establish a capability for planning and implementing integrated rural development projects with regional impact and to help implement such a program in the first of the priority regional areas ("Project").

This loan is scheduled for consideration by the Development Loan Staff Committee on Monday, September 19, 1977, at 2:30 p.m., in Room 5911 New State. If you are a voting member a poll sheet has been enclosed for your response.

Development Loan Committee  
Office of Development Program  
Review and Evaluation

Attachments:

Summary and Recommendations  
Project Analysis  
Annexes I - VII

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AGENCY FOR INTERNATIONAL DEVELOPMENT <b>PROJECT PAPER FACESHEET</b>		1. TRANSACTION CODE <input type="checkbox"/> A - ADD <input checked="" type="checkbox"/> C - CHANGE <input type="checkbox"/> D - DELETE	PP 2. DOCUMENT CODE 3
3. COUNTRY/ENTITY Panama		4. DOCUMENT REVISION NUMBER <input type="checkbox"/>	
5. PROJECT NUMBER (7 digits) <input type="checkbox"/> 525-0186 <input type="checkbox"/>	6. BUREAU/OFFICE A. SYMBOL LA      B. CODE <input type="checkbox"/> 05 <input type="checkbox"/>		7. PROJECT TITLE (Maximum 40 characters) <input type="checkbox"/> Integrated Rural Development - Tonosf <input type="checkbox"/>
8. ESTIMATED FY OF PROJECT COMPLETION FY <input type="checkbox"/> 8 <input type="checkbox"/> 3 <input type="checkbox"/>		9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> B. QUARTER <input type="checkbox"/> 1 <input type="checkbox"/> C. FINAL FY <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> (Enter 1, 2, 3, or 4)	

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT - Incl. 1st FY		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)						
(LOAN)	( 1,990 )	( 1,153 )	( 3,143 )	( 3,860 )	( 5,840 )	( 9,700 )
OTHER U.S.	1.					
	2.					
HOST COUNTRY		3,487	3,487		9,890	9,890
OTHER DONOR(S)						
TOTALS	1,990	4,640	6,630	3,860	15,730	19,590

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY <u>78</u>		H. 2ND FY <u>79</u>		K. 3RD FY <u>80</u>	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) F&N	200		230		3,143		3,786		1,366
(2)									
(3)									
(4)									
TOTALS					3,143		3,786		1,366

A. APPROPRIATION	N. 4TH FY <u>81</u>		O. 5TH FY <u>82</u>		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED  MM YY <input type="checkbox"/> 0 <input type="checkbox"/> 1 <input type="checkbox"/> 7 <input type="checkbox"/> 9
	Q. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) F&N		1,197		208		9,700	
(2)							
(3)							
(4)							
TOTALS		1,197		208		9,700	

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 = NO  
 2 = YES

14. ORIGINATING OFFICE CLEARANCE SIGNATURE <i>Irving G. Tragen</i> TITLE Irving G. Tragen Director		15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS. DATE OF DISTRIBUTION DATE SIGNED MM   DD   YY 0   8   17   7   7
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## PART I. SUMMARY AND RECOMMENDATIONS

### A. Recommendations

That a loan be authorized to the Government of Panama (GOP) in the amount of \$9,700,000 with a 20 year term including a 7 year grace period, and at 2% interest during the grace period and 3% thereafter.

### B. Description of the Project

This project constitutes a major new initiative on the part of the GOP. The integrated rural development strategy to be pursued is a fundamental change from past rural development efforts. It requires a combined effort on the part of the various sectors to provide needed inputs on a timely basis to improve the levels of living of the rural poor, at the same time testing innovative approaches locally. This project will be the first test of that strategy in an area that has been identified by the GOP for priority development. The dual purpose of the project is to help the government 1) establish an overall capability for the planning and implementation of integrated rural development projects with regional impact, and 2) implement a program for the accelerated development of the first of the priority impact areas in the District of Tonosí.

The GOP decision to adopt the strategy of integrated development of impact areas is the result of a major shift in priorities toward the rural areas of Panama. Traditionally, the development focus has been along the transit corridor bordering the canal. The current Government of Panama has reversed this trend in an effort to redress the growing disparity between rural and urban incomes and quality of life. This new emphasis has been demonstrated in increasing attention and resources for rural education, health, sanitary facilities, roads, power and communications. Agricultural development has been focused on land redistribution, collective and cooperative production schemes and an improved marketing system.

After much analysis, the conclusion was reached that the limitation on resources, both financial and human, prohibited the timely and efficient focus of all necessary inputs on a nationwide basis. The resulting strategy has evolved as an impact area approach in which potential rural development areas are chosen on the joint criteria of current poverty and agricultural potential. The Tonosí area is the first of approximately a dozen areas which will be analyzed and developed.

The program calls for a significant effort to rationalize land use patterns and tenure arrangements in the Tonosí impact area through a redistribution and resettlement scheme. It will concentrate on resettling, or augmenting farm size for, approximately 1,000 target group farm families. This will entail for many removal from marginal and/or degraded land and for resettlement on land quantitatively and qualitatively adequate for producing a minimum per capita target

income of \$400 through crop or dairy farming. These families will receive title to the land settled, and will be provided with credit to meet their production and investment needs. Technical assistance for key aspects such as farm management, credit planning, crop and livestock production, will also be provided under unified management. To complete the more rational land use scheme, a watershed management and reforestation program will be undertaken in which the degraded hillsides will be replanted in fast growing species and forest use will be carefully monitored and controlled. Also, in order to make the areas targeted for resettlement accessible during the entire year and to facilitate marketing, the project will include a road improvement program. Drying and storage facilities will be provided for key crops.

Pilot projects aimed at more efficient resource utilization will be sought out and tested in an effort to identify activities through which the target population could diversify incomes and employment.

Integration of the project into other activities under way, or to begin, in the Tonosí area will assure the participants of other services needed to meet their basic needs. These activities, funded under other AID projects and some with other donors, include education, housing and health.

To manage the program, mechanisms will be established at the national and field project levels. Assistance will be provided to special units in the Ministries of Planning and Agriculture to plan and implement the project at the national level. A Coordinator in Tonosí, assisted by a technical staff, will manage the project in the field.

Existing project participant organizations will be incorporated into the program and new ones will be created to assure the articulation of target family needs as well as economies of scale in production and services.

The project constitutes but the initial phase in the major reorientation of the GOP's rural development strategy. The government has already identified five additional impact areas which will be phased into the integrated strategy; long-term plans call for the identification of many other areas.

### C. Summary Findings

The project is technically and economically sound and consistent with the socio-cultural environment of the rural poor.

At the central level, the implementing institutions are functioning and, with the proposed training and technical assistance financed by the loan, will be capable of assuming the responsibilities required of them under the project. The creation and responsibilities of the Technical Planning and Coordinating Committee and High Level Commission have been specified in writing and are awaiting legal formalization.

At the area impact level, each of the component parts has been analyzed and found to be technically, economically, socially and environmentally feasible.

1. Land Redistribution: The GOP, with the updated census and cadastral mapping information, will be able to identify and classify land in the Tonosí area. In addition, the Government (through the Directorate General of Agrarian Reform of MIDA) will have the data needed to pinpoint exact land parcels to be redistributed and the potential participants.

2. Agricultural Production: Studies and past experience indicate that the two major production activities - crops and dairy - are feasible for the Tonosí area.

a. Crops: Based upon land capability and soil analyses, and climatic, environmental and social factors, the crops selected for cultivation are well suited to the project area and project participants. In many cases, the crops have been grown for some time by small farmers in the area and the technologies are well known. In the cases of crops not previously grown, the technologies will be new to the farmers and to the area, but will be very simple and are in use elsewhere in Panama. In general, newer technologies will be introduced only gradually as farmers gain confidence in the Area Team and in their own capabilities. The projected yields will enable the small farmer, over the life of the project, to attain projected income levels. The projections are - if anything - conservative and comparable to average yields that have been obtained in Panama under similar conditions and technologies. Current marketing channels and facilities are sufficient to adequately handle projected increases in production with the exception of onions and rice. Increased onion storage capacity and rice drying equipment, to be loan financed, address this shortage.

b. Dairy: This activity is an ongoing one in the Tonosí area using elementary technologies. In view of the fact that improved but simple technologies will be introduced (e.g., better grasses, forage conservation), land more suited to this kind of operation will be utilized, and higher quality milking cows and purebred bulls or semen will be purchased, yields should increase substantially over the life of the project. However, for purposes of determining economic feasibility, conservative increases in yields were projected. Even so, the calculations indicate that these activities are viable. It was determined that current marketing capacities (two major milk plants and one cheese plant) are sufficient for processing the additional milk that will be produced.

3. Road Improvement: The 80 kilometers to be upgraded to all-weather, gravel-surfaced roads are necessary to give all project participants year-round access (within two hours walking distance) and will facilitate marketing. Costs were based on similar roads in Panama including a 12% inflation factor. Based on participants to be served and volumes of produce (not including externalities), economic analysis demonstrates a benefit/cost ratio that is greater than 1 (one). Standard MOP specifications will be followed in the road construction, and, to the extent possible, labor intensive methods

will be used enabling the employment of local people. Maintenance will be the responsibility of the Municipality and localities and will be negotiated by the MOP, which will also provide supervision.

4. Watershed Management and Reforestation: The project's effort in this area will be a limited one, well within RENARE's existing capabilities. The 1500 hectare reforestation program under the loan represents less than 10% of the GOP's long-term 21,000 hectare target for the area and seedlings of species that can be grown in the Tonosí area are available in the country. Once the redistribution and resettlement program has been completed and all of the land to be reforested has been vacated, the reforestation program can be implemented without major problems. Soil and water studies to be undertaken will be done by technically qualified personnel or contracted with appropriate public agencies.

5. Information Refinement: The GOP has considerable experience in the survey work contemplated under the program. The orthographic equipment and technical assistance in its use - both to be financed by the loan - will greatly enhance an existing capability. This, and the assistance being provided by the U.S. Census Bureau for editing and tabulating the 1977 Tonosí census, will eliminate the need for contracting such activities in the future, with a tangible money and time saving.

6. Pilot Projects: Those identified to date require minimal technological input, for which present GOP capabilities are sufficient. Judgements on additional needs will be made on a case-by-case basis as other possible pilot projects are identified.

#### D. Issues

1. Project Cost per Participant: Compared to the expenditures for most comprehensive agricultural development projects in Latin America, an expenditure of \$8.2 million <sup>1/</sup> for a total of 1,000 project participants - i.e., \$8,200 per family - is not unreasonable by any measure. <sup>2/</sup> Moreover, a number of factors should be taken into

<sup>1/</sup> The loan share allocated for the Tonosí area project. Total projected expenditure per family - including counterpart - will be about \$15,000.

<sup>2/</sup> Thomas Carroll of the IDB (in Felipe Herrera, Ed., Una Década de Lucha por América Latina, Mexico, 1970) showed that at that time investment per farm unit in "intensive land development projects" in Latin America was \$18,500; that it was \$4,350 in "medium intensive land settlement" (the case of Tonosí) and \$3,400 in mere supervised credit projects. Carroll's calculations indicated that, regardless of the nature of the project or the amount spent per farm unit, gross output targets per \$1,000 invested tended to cluster closely around \$500. It is perhaps more than coincidence that the projected gross output increment per \$1,000 to be invested in Tonosí is \$485 (noting that inflation does not change the ratio since both input and output prices have risen in similar proportions).

consideration in arriving at a judgment on cost "reasonableness". Many of these factors are overlooked when the cost per participant approach is oversimplified.

Above all, certain investments in infrastructure and resource conservation and rehabilitation will produce a stream of benefits over a long period of time and these benefits are not limited to the "target group" or to the present generation. A more sophisticated benefit/cost calculation than was done for this project could well allocate a substantial portion of the \$2 million programmed for roads, watershed management and resource surveys 1/ to double the number of families included in the target group and to another 20 percent natural increase in the number of families during the next ten years (not counting in-migration from neighboring districts which is certain to take place).

Secondly, it should be obvious that investment levels required for converting Panama's rural poor into viable commercial farmers may not be compared with those programmed for countries with one-half the per capita income of Panama or less. Nor is a meaningful comparison possible of this project with programs designed to slightly raise subsistence levels of peasants for whom there is no alternative because the country has run out of land resources or because the Government is unwilling to redistribute inequitably allocated land resources. The fact that Panama's average per capita national income is \$1,200 (and that, hence, a target rural per capita income in a development project cannot properly be lower than the proposed \$400) obviously implies, inter alia, that average, and especially marginal, capital investment per worker tends to be - or at least should be - considerably greater than in an economy where average income is closer to the subsistence level.

Thirdly, a financial distinction must be made between directly recoverable expenditures such as credit, and public investments that at best are returned to the treasury only in the long run, and at considerable discounts, through taxation. In the case of the Tonosí project, this means that, if the loan portions earmarked for farm credit and procurement of machinery (which is amortized by the participant farmers) are deducted, non-recoverable public investment per family will be but \$4,500 for the loan portion, and \$9,700 including all project costs.

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1/ Besides, the cost of resource surveys is normally charged off to pre-feasibility or feasibility studies, rather than to direct project costs.

Finally, during project preparation both the Mission and the GOP planners took care to hold expenditures down to the minimum considered essential to achieve basic project goals. Among other things, a number of "frills" were dropped along the way, such as: a complete updating of a 1967 feasibility study for a large scale irrigation project (considered premature); detailed soil mapping of all 135,000 hectares in the district (considered unnecessary); transportation equipment for project inputs and produce (private facilities in province adequate); investments in processing facilities for fruits and vegetables and other agroindustries (partly unnecessary and partly premature); a large-scale aquaculture scheme (replaced with a possible small pilot project); the reforestation component was cut in half from the original proposal, as was the amount to be spent for the procurement of farm machinery and the field project staff, etc.

A possible sub-issue related to that of overall expenditure per family or farm is that superficial analysis may lead to the perception of directly productive investment per dairy farm family of around \$12,000 (in the form of completely recoverable credit) as a "luxury". The Mission believes that careful reference to target group and project description in this Paper, as well as to technical and economic analysis, should allay such an impression. Briefly stated, the argument is as follows: (a) rational land use limits the growing of high yielding crops to about 10% of the district area; (b) small-scale, semi-intensive dairy farming - an ongoing activity in the area - is, unlike beef cattle raising, economically and socially well suited for peasant enterprises; it also provides much more evenly distributed employment throughout the year than do field crops; (c) compared to world levels, milk in Panama is underpriced while crops tend to be overpriced; hence, comparison of rates of return understates the relative benefits to society from milk production in Tonosí; moreover, milk yields have purposely been projected at a very conservative level; (d) Panama spends more foreign exchange for importing milk and milk products than for any other single food product that can be produced in the country and the Government has instituted a vigorous national milk promotion campaign; (e) the planned level of investment per farm - starting virtually from zero - is based on extremely simple - virtually 100% biological - technology and represents the absolute minimum required to produce the target output and income levels (and two-thirds of the final cow herd will be produced on the farm), and (f) the direct participants will be just as poor as those to be involved in crop production (in some cases there may well be mixed joint crop/dairy enterprises); the less poor will be included in the World Bank/Banco Nacional project (which assumes an average investment of \$25,000 per ongoing 50-hectare farm).

2. Project Timing: Even though the GOP and the Mission have been engaged in preparation of this project for nearly two years, the

proposed phasing for the implementation of the Tonosí impact area development devotes the first year essentially to preparation for physical execution (except for road building and staff facility construction). The Mission considers this a "chicken and egg" type issue: without formal assurance of external resources, the GOP was obviously not in a position to commit more financial and human resources than it already has (about \$500,000 to date, according to a PRODIAR estimate) to project preparation for integrated rural development. Even so, the GOP and the Mission have advanced substantially in the updating of basic information required for operational implementation plans (a new census is to be tabulated before the end of 1977; aerial photography for the new cadastral survey is completed, and an initial socio-psychological survey is about to be made). What has not been possible so far is to establish a permanent project team in the area, whose task will be to convert basic resource and social information into operational plans and, above all, fully to involve the district's population in the planning process. Indeed, desirable as an earlier effort in the latter sense might have been in theory, the Mission agrees that it would have been politically unwise for the GOP to stir up more expectations than are already evident in the area prior to assurance that the external resources have been committed. It would have been equally unwise to have begun the land redistribution effort, prior to the formal inception of the project, even if up-to-date cadastral information had been available. As explained in the Project Description, completion of this phase is an indispensable precondition for the implementation of true development activities. The land redistribution aspect of the project represents a very sensitive political move by the Government. The GOP's willingness to undertake these actions is evidence of the seriousness of their dedication to the project. To be politically acceptable, however, this redistribution must be part of an overall program to provide technical assistance, credit and other services. The GOP believes it has gone as far as it can without the resources committed by AID to assure that the entire effort can proceed on a coordinated basis.

The shaping of an institutional framework, and the network of communications within it, for planning and implementing an entirely new, untested approach to rural development has been, and will continue to be for some time, a very complex and delicate exercise. Not all of the problems that arise can be foreseen, and ad hoc resolution often cannot be hurried. The Mission is confident that the substantial additional infusion of technical assistance and training to be supplied by the loan - provided it is of the required quality - will help the GOP to perfect its apparatus in such a way that it will improve and accelerate future project preparation and implementation materially.

Last but not least - aside from the land redistribution aspect - the Mission considers that allowing a year for basic

preparation before proceeding to physical implementation of agricultural development is far from being a negative issue. On the contrary, project ex-post evaluation and theoretical literature is increasingly concerned lest excessive pressure in externally financed rural development projects for physical implementation and financial disbursement rates lead to serious disappointment among the target population and the national and external financing institutions because insufficient time was allowed for thorough consideration of operational implications of alternatives and for thorough acquaintance of project staff with environmental and social realities.

## E. PROJECT TEAM

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BOUCHARD, Bruce  
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- PLUHAR, Ivan, Indus. Econ.
- RIFFO, Luis, Agric. Planner
- SHUART, Edmuni, Dairy Prod. Spec.
- WEIZMANN, Herzl Gera, Rural Planner

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- CARLSON, Beverly
- DISKIN, Barbara, Mathematical Statist.
- LEVINE, Linda, System Analyst
- MALKOVSKY, David, Programmer
- RICARDO, José M., Ag. Economist
- VALENTINO, Peter, Survey Statistician

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- Guillén, Alvaro

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- DE LEON, Elvio
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- PEREZ, Clímaco
- RUIZ, Viodelda
- SALERNO, Carmela de

PART II. PROJECT BACKGROUND

A. Policy Setting

A number of recent policy statements and official studies have emphasized the urgency of achieving a more rational resource use, raising the incomes of the poorest strata, and improving general levels of living in a number of Panama's rural regions which have been left behind in the country's economic and social progress of recent years.

Within this broad policy context, the GOP has also designed agriculture as a key development sector, with the emphasis on rapidly increasing production and more fully incorporating the rural poor into the political, economic and social life of the country.

A number of nationwide programs have been initiated during the past six years to meet this end. The agrarian reform program has established more than 200 asentamientos and juntas agrarias for landless campesinos or minifundistas for organized cooperative farming. These continue to be actively supported with technical assistance, credit, marketing, and processing services. Other joint production efforts among the rural poor - such as juntas comunales and locales and community gardens, are spreading as well. A complete reorganization of public institutions for the agricultural sector was undertaken in 1973. Credit to agriculture, particularly to the smaller producers - individually and through joint production and cooperative organizations - has been expanded significantly. New programs in execution or in preparation include three new sugar production/processing units; protection and development of the Bayano basin; agro-industrial promotions; improvement of the agricultural marketing system; strengthening of rural market towns by improving their basic infrastructure, services and finances, and providing incentives for private investment. 1/

At the same time, basic rural infrastructure and services in health, education and housing have been tangibly improved as measured by the growing number of small communities with safe water supplies and rates of rural school attendance and literacy.

1/ For more detail, see Agricultural Sector Assessment, March 1, 1976, pp. 38-57.

Health services provided by the Ministry of Health and the Social Security System are to be fully integrated into all nine provinces by the end of 1977 to expand the non-discriminatory availability of public health, hospital, and medical facilities.

AID support for Panama's rural development effort directed essentially at the most disadvantaged has been significant. Virtually the entire active loan portfolio of nearly \$40 million as of early 1977 was for agricultural marketing, credit and development for rural cooperatives and municipalities.

## B. Project Rationale

### 1. Regional Development

Recognizing the need for geographically better balanced development the GOP, with the assistance of UNDP, in 1975 began to define a set of regional development policies, criteria and strategies. This planning framework was published in late 1976. <sup>1/</sup> At the same time, it became increasingly evident to the GOP and to the Mission that, owing to institutional and financial limitations, it would not be possible in the medium run to remove even the key constraints on rural and agricultural development at a national scale. <sup>2/</sup> Thus, while certain constraints - e.g., price policies - by their very nature will continue to call for national solutions, a regional concentration based upon the total development of rural "impact areas", and of key urban centers <sup>3/</sup> would offer far greater possibilities for problem solving than would a more generalized approach. The regional approach provides the opportunity to put into effect - at least in a limited area - the entire package of necessary inputs and to closely monitor the results and refine the system so that successful elements of the development program can be expanded to other areas.

1/ Ministerio de Planificación y Política Económica, Estrategia para el Desarrollo Regional a Mediano y Largo Plazo, Sept. 1976.

2/ See Agricultural Sector Assessment, Chapter XI.

3/ See PRP "Growth and Service Centers Development", dated October 26, 1976.

## 2. Experience to Date and Status of Integrated Rural Development

Integrated agricultural development on a modest scale has been taking place for a number of years in certain mountainous subsistence farming - partly indigenous - areas. Some have been helped by UNICEF and coordinated by the Ministry of Planning (MPPE). Others are managed by the Ministry of Agriculture's Directorate of Natural Resources (MIDA-RENARE) and combine resource protection/rehabilitation with improvements in subsistence farming and introduction of intensive market crops.

In 1974 a small mission was fielded by the FAO/IBRD Cooperative Program at the GOP's request to conduct a general survey of certain areas then tentatively proposed for integrated rural development. An additional small team was fielded in 1975 by the FAO/IDB Cooperative Program for approximately three months. Two area development projects (Renacimiento in Chiriquí and Monteoscuero - Cermeño in Western Panama) were prepared with the team's active participation. The Chiriquí proposal is presently being revised by the GOP. The Monteoscuero - Cermeño proposal is also under study by the GOP and may be presented for FY 78 AID funding.

The original list of eight integrated rural development projects to be financially supported by AID and the IDB in the short run (see IRR submitted in February 1975) has been revised as well as scaled down as a result of growing awareness of institutional limitations and of Panama's increasing public finance strictures. The joint list presently encompasses six areas (see Annex VI, Map 1):

<u>AREA OR DISTRICT</u>	<u>PROVINCE</u>	<u>PROSPECTIVE EXTERNAL LENDER</u>
Tonosí	Los Santos	AID (FY 77)
Renacimiento	Chiriquí	IDB (CY 78)
Barú	Chiriquí	IDB (CY 78)
Southern Soná	Veraguas	IDB (CY 79)
Southern Montijo	Veraguas	AID (FY 78)
Capira	Panamá	AID (FY 78)

The total estimated project participants in the six areas comprise about 10,000 families, or 20 percent of Panama's rural poor. The criteria for the selection of area projects continue to be a combination of indicators of rural poverty with resource development potential, leavened by the kind of grass-roots political pressure that tends to be an important ingredient of success.

The GOP's institutional capacity for planning a coordinated approach to area development has grown substantially since its rudimentary beginnings in late 1974. A core team of 16 specialists is presently working under capable leadership in the Program for Integrated Development of Rural Areas (formerly PRINDER, now PRODIAR) of the MPPE. The PRODIAR Coordinator is simultaneously Director of Provincial Planning of the MPPE - a combination that is mutually beneficial.

Collaboration of the Ministry of Agricultural Development (MIDA) - which has a key role in both planning and implementation - until late 1976 had been virtually confined to the secondment of a small team to PRINDER. Owing to a series of personal and institutional problems, the MIDA input under that arrangement was minimal. Following various personnel and policy changes in late 1976 the focal point for agricultural planning of impact area projects was transferred to the offices of the Directorate General of Sectorial Planning in Santiago, where the full resources of the Ministry - including the UNDP/FAO/AID supported agricultural planning advisory team - are available to support the planning efforts. Periodic meetings are now held between MIDA and MPPE personnel in Panama City and in Santiago and the MIDA drafts of area plans are thoroughly reviewed with MPPE, especially from the point of view of their compatibility with overall planning criteria and parameters.

Under the guidance of the external advisors, the planning framework for the first area project - Tonosi - was systematized in accordance with the methodology employed in the design of the 10-year national agricultural development plan. <sup>1/</sup> All known parameters and constraints were fed into a relatively complex linear programming model the results of which laid the foundation for the five-year priority program for the target group described in Part III below.

1/ See Agricultural Sector Assessment, Chapter IX.

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Dissatisfaction with out-of-date information systems, such as the 1970/71 censuses and the 1965/68 cadastral and resource survey, have led to implementation of new surveys that will allow refinement of annual operations plans for the first project and will make the advance planning for the new project areas more precise. In the process, general inter-institutional understanding and cooperation has been improved materially, not only among distinct ministries and autonomous agencies (and between these and the MPPE), but also within the agricultural sector and even within MIDA, where the specialized directorates have had to integrate their inputs into the general scheme of overall regional planning. Much remains to be accomplished in this respect but a good beginning has been made thanks to the commitment of key officials and technicians.

Top-level political support for integrated rural development has continued; indeed, the staffs have been subjected to considerable pressures from the Ministers and Vice Ministers of both key ministries concerned to show concrete outputs from the comparatively ample resources that have been put at their disposal.

Substantial technical assistance has been provided by the Mission. Through June, 1977 over 100 man/months of long and short-term consultant service had been provided for the program from Mission Technical Support funds and RSSA contracts through the USDA. 1/

### 3. The Meaning of Integrated Rural Development in Panama

Before proceeding to specify the constraints of the first impact area to be included in this project, it is necessary to clarify what is meant by integrated rural development in the Panamanian context, as regards both the institutional coordination of inputs and the delivery of these inputs to the participant population. In the Panamanian context, integrated rural development can presently be defined as a combined effort - in specific underdeveloped, rural poverty areas of the country with a resource development potential - of the country's various sectorial programs and policies with the purposes of increasing production within the development areas and of improving the levels of living of their inhabitants.

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1/ This does not include 36 man/months of consultant time contributed by the Mission in 1975 to the first phase of the joint agricultural planning exercise nor an estimated 60 man/months of Mission staff time.

The design of the area projects includes mechanisms for the identification of the basic causes of rural poverty and for overcoming these constraints. This includes the provision of the necessary resources for increasing production, productivity and incomes and for improving health and education levels, as well as the creation or reinforcement of institutional mechanisms for full community participation in the process of socio-economic change.

The integrated rural development concept originated in Panamawas the result of a genuine, indigenously felt need. The decisions on national and local level integration that have already been made arose from a year-long process of discussions and compromises at the technical and policy-making level. Since there has not yet been any opportunity to test these decisions in practice, they exist at this stage only on paper. Obviously, problems will arise during implementation. But on the basis of the evidence to date, the GOP personnel involved is sufficiently flexible and pragmatic to make the appropriate adjustments in the structure and functioning of the mechanisms as and when problems are encountered. Implementation of the project will be designed to help identify problems and make it easier, rather than harder, for the Government to make such adjustments.

4. Dual Nature of the Project

This project has two discrete though interrelated sets of purposes, both directed toward the same goal, i.e., to materially improve economic and social levels of living for the poorest majority in selected rural impact areas and in the process to increase domestic supplies of agricultural products for domestic consumption and export at the lowest possible cost.

Integrated rural development is designed to be a long-term, continuing activity. Hence, the fundamental purpose of this project is to (a) provide the GOP with the institutional capability for planning and implementing area development projects at an increasing rate and in the most efficient and effective manner possible, and (b) to help launch the first of the integrated rural development area sub-projects (in the district of Tonosí) on the road to self-sustaining growth.

## 5. Institutional Constraints

Planning and implementation of integrated rural development is in its infancy in Panama. The country's small population imposes serious handicaps on both the private and the public sectors in terms of availability of trained managerial and technical personnel. The shortage of trained and experienced personnel has been further aggravated in the past by the lack of coordination of development activities at the regional and local level. Serious efforts have been made in recent years to correct this latter problem. For example, Provincial Coordinating Councils have been established, and provincial planners have been appointed by MPPE to work in each provincial office. Joint regional offices have also been established combining agricultural extension, development lending, and marketing programs under the responsibility of three different agencies.

Some of these provincial planning/coordinating mechanisms, including provisions for local level participation in decision making, are already performing an important role. However, their potential is not being fully realized. This project is designed to help reinforce the structure which has been provided by pointing the way to its intensive utilization in rural development with increasing local participation in the entire process.

### C. Tonosí Impact Area

The district of Tonosí appears well chosen as a representative microcosm embodying a set of basic, interrelated constraints that have impeded economic growth and social development despite the existence of a potentially ample resource base.

The evident and inter-related symptoms of the district's underdevelopment are: (i) substantial underutilization of the best lands, accompanied by relatively low population density, (ii) excessive use of land of lower capability, (iii) rapidly accelerating forest destruction with resulting soil degradation, (iv) total or seasonal inaccessibility of large areas of good level land due to poor roads, (v) increasing concentration of land resources, on the one hand, and increasing numbers of subsistence farmers and landless peasants on the other, and (vi) a marked degree of social disintegration characterized by abandonment of traditional social patterns without the compensatory effect of positive modernizing influences.

1. History

Until the 1920's when the United Fruit Company purchased 36,000 hectares for possible banana production, Tonosí was an isolated, inaccessible area of medium-sized cattle ranches surrounded by dense primary forests. Crop production was entirely for local consumption. No bananas were ever produced in Tonosí, due primarily to world depression, and the area reverted to traditional cattle ranching and subsistence farming. Nevertheless, the United Fruit Company retained control over the land until 1950. 1/

In 1950, the traditional physical and social isolation of the district began to be breached by a combination of (a) the entrance of well-connected cattlemen from neighboring Los Santos district, wise enough to lay claim to a good part of the lands newly reverted to the public domain, and (b) the introduction of air passenger and freight service.

Tangible changes came to Tonosí beginning in 1965 with the opening of the first all weather road to the outside world. This attracted a strong influx of both slash-and-burn campesinos and cattle ranchers in search of virgin, unoccupied land.

About the same time the Government announced the inclusion of Tonosí in the Plan Robles, initiated in 1964. This program was not designed as "integrated" development though the agricultural portion was supported in several areas - including Tonosí - by a \$2.4 million AID loan (010).

In 1965-66, Tonosí received \$31,000 of crop credit and \$83,000 for livestock credit under the Plan, out of total AID credit resources of nearly \$1 million. Moreover, the area for the first time obtained a local agricultural advisory service, for which AID provided buildings (offices, dormitories and a storage/machinery shed) which are still in good condition and being intensively used. (The

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1/ For more detail, see Social Soundness Analysis (Annex V).

present project in small part proposes to expand these facilities.) Needless to add that the present project will be implemented in a totally different political environment as well as in a substantially reformed bureaucratic structure.

The Plan Robles in Tonosí never really got off the ground as a development program. The primary reason given in both the AID and Ministry of Agriculture final project reports for the non-achievement of the project goals was the lack of financial resources available to ministries other than Agriculture (which was supported by the AID loan) to carry out the project as planned.

According to local sources, the lack of real impact of what had been announced as a plan for the development of the district had a profound effect on the local population in terms of their trust in Government promises.

Analysis of the present situation in the district of Tonosí is based essentially upon data from the 1970 population census and the 1971 agricultural census, <sup>1/</sup> as well as on repeated field visits, socio-economic case studies based on unstructured but in-depth interviews, and an informal sample study of soils and certain technological practices carried out as part of the Intensive Review.

## 2. General Description and Constraint Analysis

The District of Tonosí comprises an area of 1,355 sq. km. (35% of the area of the province of Los Santos) and an estimated 1975 population of 12,200, for an average density of only nine per square kilometer. This represents only about 40% and 20% respectively of the density of the neighboring rural districts of Macaracas and Guararé. The district is located at the southern tip of the Azuero peninsula, within a semi-circle formed by an arm of the central mountain range that runs the length of the Isthmus of Panama. It coincides roughly with the watershed of the Tonosí river and its five tributaries. The confluence of the five

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<sup>1/</sup> An up-to-date census and certain sample surveys are being undertaken as part of pre-project implementation activities as explained under Project Description below.

tributaries with the Tonosí has formed an alluvial plain surrounded by gently sloping hills. The higher mountains surrounding the valley are steep, with deep crevices. All slopes are susceptible to erosion. About 40% of the watershed is still in forests but with little present commercial value.

Fifteen percent of the land - an unusually high percentage for the Azuero peninsula - or about 20,000 hectares - is flat (less than 3% slope) and composed mostly of relatively fertile alluvial soil. However, nearly one-third of this area (6,000 has) is subject to periodic seasonal floods which limit its capability. According to the 1967 cadaster, 12% of the area - i.e., almost the entire alluvial plain - consists of class II land (can be used for intensive cropping with few limitations), compared to only 3% for the country as a whole (not including the Darien and the Atlantic Coast). On the other hand, 85% of the land is in classes VI and VII, (not arable but, aside from forestry, can be used for grazing under careful management). (Annex VI, Maps 2 A, 2 B and 3).

Mean annual rainfall at Tonosí between 1924 and 1963 exceeded 2,000 mm and was over 3,000 mm in the mountains to the west. Between 1970 and 1974, total annual rainfall at Tonosí ranged from 1830 mm to 2609 mm. There is a pronounced dry season between December and April.

#### a. Man and the Environment

Tonosí constitutes a microcosm of the dynamics of settlement in the remainder of the Pacific slope of Panama. However, its isolation until little more than 10 years ago places Tonosí into a transitional phase between straight slash-and-burn frontier settlement and the fairly stabilized farming and ranching that by now characterize the majority of this part of the country. This fact has deep implications for a development strategy and for the manner in which such a strategy is implemented, in technical, economic and social terms. The typical campesino and cattle rancher in Tonosí has not yet outgrown the frontier mentality. Stated in economic terms, the bulk of their investments of labor and capital still tend to be at the extensive margin. The subsistence campesino without capital continues to search for a piece of

free, virgin hillside that can be cut and burned over to provide food for the family for a few years, after which it is seeded to pasture and "sold" to a better-off neighbor who wishes to expand his cattle herd. The problem is that new land capable of supporting continuous grazing was exhausted some years ago; hence, at present man is encroaching upon the few remaining forested hillsides which have already been declared to be forest reserves. This tradition is so ingrained in the Azuero peninsula, including Tonosí, that a fanatic enmity towards trees has become an almost proverbial characteristic of the agricultural population of this entire region, with the result that almost the entire peninsula resembles a semi-desert towards the end of the dry season.

b. Man and the Land

As indicated earlier, there had reportedly been a substantial influx of population into the district of Tonosí in the 1960's. But according to census figures, Tonosí's average annual rate of population growth of 2.7 percent between 1960 and 1970 - to a total of 10,648 - was smaller than the average national rural rate of population increase. 1/

In view of the quantity and quality of land resources in Tonosí and the low density of the population, the fact that there was no net immigration can be assumed to indicate a certain degree of desperation among the original campesino population which (a) has not yet learned to increase production and thus incomes at the intensive margin, (b) in general is hardly participating in the market economy, (c) has witnessed an increasing concentration of control over the better land resources.

The land tenure structure, coupled with the backward state of the road network, has also resulted in a higher population density on marginal land than on the more productive alluvial land, as well as in a generally more intensive use of the marginal land.

1/ Pending results from the 1977 census (see Part III C) population is officially assumed to have grown at the same rate in subsequent years, for an estimated total population of 12,500 in 1976.

The dynamics of the man/land relations in Tonosí are illustrated by the comparison of 1961 and 1971 agricultural census data. Total land in farms during the 10 years expanded at a rate of nearly four percent per year. But the area in crops actually declined by about one-fourth during the period, while grazing land increased by 9 percent per year.

The number of farms of less than three hectares increased by 70 percent during the 1961-1971 period, while their average size declined from 1.6 to 1.1 hectares. There were almost 300 fewer farms between three and 20 hectares - a decline of 45 percent. This trend also reflected the incorporation of small parcels into medium and large units. The number and average size of smaller family size units (between 20 and 50 hectares) <sup>1/</sup> did not change substantially between the two censuses, but the number of large farm units - and the amount and the proportion of the land controlled by them - increased markedly. At the upper end of the range, the number of farms reporting more than 500 hectares increased from four to seven, their average size from 647 to 1765 hectares, and the proportion of total farm land occupied by them from five to 15 percent, for a total of over 12,000 hectares. (Table II-1).

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<sup>1/</sup> These are mostly devoted to small scale cattle ranching.

TABLE II-1

TONOSI: Farms by size classes, 1960 and 1970

Size class (has.)	1960			1970		
	No.	000 has.	Average size (has.)	No.	000 has.	Average size (has.)
Less than 3	339	0.5	1.6	575	0.7	1.1
3 to 19.9	647	5.4	8.4	360	3.0	8.1
20 to 49.9	333	10.4	31.1	345	11.0	32.0
50 to 499.9	347	36.6	105.6	492	53.9	109.6
500 and more	<u>4</u>	<u>2.6</u>	<u>647.2</u>	<u>7</u>	<u>12.4</u>	<u>1765.6</u>
Total:	1670	55.5	33.3	1779	81.0	45.5

Source: Agricultural Censuses.

As is common in the more remote and less developed areas of rural Panama, legal titling of land has not been considered of great importance by the farmers and ranchers in Tonosí. A special survey by MIDA's agrarian reform directorate shows that by 1976 a total of only 233 out of 1640 occupants of land had acquired titles to their 325 land parcels. The land with titles - 14,400 hectares - represented 17% of the total occupied. The average size of titled properties was 62 hectares.

Significantly, the proportion of the owners with title to total occupants ranged from 35 percent in the fertile lowlands to a mere two percent in the mountainous upstream areas.

c. Crops

Of the 4,454 hectares of annual crops grown in 1970-71, 53 percent was in rice and 37 percent in maize, mostly on marginal land as indicated by the low yields, and with a low level of technology employed on virtually all farms, as shown by a special sample survey made in 1975.

Of the little more than 1,000 hectares of perennial crops grown in 1970-71, one-half was in miscellaneous tropical fruit trees, and 13 percent was in sugar cane for homemade brown sugar.

Eighty-seven percent of the rice was grown on farms with less than 20 hectares and none on farms of more than 100 hectares. While a few larger operators have started growing rice with heavy mechanization in the intervening years (Table II-2), none were found to use an optimum package of technology in a 1975 sample study. Ninety-three percent of the maize and all the beans were grown on farms of 10 hectares or less, as well as nearly 60 percent of the rootcrops (mostly cassava) and all of the minor crops such as coffee, sugar cane, plantains and bananas.

d. Cattle

Pastures are found almost entirely in farms of more than 20 hectares. The 11.5 percent annual rate of increase of cattle on

TABLE II 2

TONOSI: Estimated Area, Market Production, Price, Value and Yield per Hectare of Principal Crops for Sale, December 1976 - May 1977.

<u>Product</u>	<u>Area</u> (Has.)	<u>Production</u> Cwt. (M.T.)	<u>Average</u> <u>Farmgate</u> <u>Price</u> (\$/cwt.)	<u>Gross</u> <u>Value</u> 000\$	<u>Yield</u> Cwt./ha. (MT/ha.)	<u>Main</u> <u>Market</u> <u>Outlet</u>
Rice	1,030	71,800 (3,256)	9.02	648	69.7 (3.2)	Private mills
Maize	47	2,500 (113)	7.45	19	53.2 (2.4)	Private mills
Tomatoes	12	3,140 (142)	4.53	14	261.7 (11.9)	Canning factory
Onions	1	164 (7.4)	13.00	2	164.0 (7.4)	IMA

Source: Field survey.

farms between 1960 and 1970 was double the rate for the rest of the country and slightly above the annual rate of increase in grazing land (9 percent).

There were approximately 65,000 head of cattle in Tonosí in May, 1971, i.e. at the very end of the dry season. About one-third were dual purpose beef and milk animals; the remainder were being raised or fattened exclusively for beef.

Management practices on both beef and milk cattle ranches, with a few exceptions, are very traditional, relatively more so in the case of milk than in the case of beef. In 1970 the district produced 5.3 million pounds of meat on the hoof and 3.3 million liters of milk. This represented an output of 110 lbs. of beef and 240 lbs. of milk per hectare of pasture. The fact that these yields are, respectively, twice and 1.5 times as high as the national average for that year is believed to reflect more the better quality of the district's natural resources (including the rainfall pattern) than of management practices.

Pastures are not seeded to the best adapted species and no legumes are used at all. No efforts are made to conserve forage for the dry season. Only about one-third of the cattle received mineral supplements with salt. Animal health measures are relatively unsophisticated, but there appear to be no serious problems in the area.

There is an additional constraint on commercial milk production in the western (Guánico) portion of the district which is inaccessible for vehicles during a large part of the wet season. As a result, milk output in that area paradoxically is substantially higher during the dry season.

With the exception of one or two large enterprises, milk production in this area seems to have arisen largely to provide a steady cash flow for small and middle size cattlemen.

e. Forest and Water Resources

The irrational land use pattern described earlier had already led at the time of the 1967 cadastral survey to complete deforestation of the watershed except for an upland area of 63,000 has. (47 percent of the total land area). There is little timber of prime commercial value left in the remaining forests, and the commercial value of the remaining stands needs to be surveyed in detail. The 20,000 has. of forest reserve declared along the western divide of the Tonosí watershed are not immune from continued encroachment by land-hungry campesinos and cattlemen.

Deforestation and overgrazing have also led to an increasingly serious problem of soil degradation on the slopes and seasonal downstream flooding, on the one hand, and reduced stream flow during the dry season, on the other.

Soil and topography data show that approximately 10,000 has. of the lower Tonosí valley are potentially irrigable (including the 6,000 hectares subject to occasional flooding.) A combination flood control/irrigation project costing possibly \$15-20 million based upon a system of irrigation and drainage canals and flood control levees would be necessary to reach that potential. Considerations of overall national resource allocation have not assigned high priority to large, storage-based irrigation projects for Panama at this time. Nevertheless, there are about 2,000 hectares of alluvial land in the Tonosí valley and 600 has. in the Guánico river valley that are irrigable through gravity flow even at minimum flow. Moreover, geological data indicate that there may be substantial aquifers of good quality ground water that warrant further exploration.

f. Public services for Agriculture

As mentioned earlier, resident public services for farmers were introduced in 1965 as part of the project financed by AID loan 010. Currently assigned personnel of MIDA (supported by regional technicians from the provincial capital) are clearly insufficient to cope with

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development problems of an area comprising 135,000 hectares and approximately 2,000 farm operators at present.

The Agricultural Development Bank (BDA) also has a small sub-agency in Tonosí. In 1975, 134 loans were made for a total of \$367,000. Of the total value, 44 percent was for cattle and 41 percent for rice. The average loan amounted to approximately \$2,700. <sup>1/</sup> Larger cattle operators receive unknown quantities of credit from the Banco Nacional de Panama (BNP) and from the private banks.

There are no public, cooperative or privately owned storage facilities of any meaningful size in the district for either agricultural produce or for supplies. The nearest facilities are at, and just north of, the provincial capital.

g. Education, Health and Housing

Objective indicators of social levels of living in the district have improved materially since 1970, to the extent that data are available. Yet more needs to be done if conditions are to be created that will encourage the present population to retain their roots in Tonosí and to attract on a permanent basis the additional population that the economic resources of the district are capable of supporting.

In 1970 the average illiteracy rate among persons 10 years or older in the district was still a high 43 percent (compared with a national average of 35.5 percent for the rural population as a whole), but this was already substantially lower than the 55 percent illiteracy rate in 1960. Illiteracy rates vary widely among areas of the district.

The 38 existing elementary schools are said to be accessible to all. The school enrollment rate

<sup>1/</sup> This average probably included the loans to the few production groups and to the Production School (see below).

in 1970 (74 percent) was virtually identical to the national average for rural areas. In absolute terms, school enrollment had been increasing through 1973, after which it dropped slightly, perhaps reflecting out-migration during the 1970's that cannot be statistically verified in any other way. This drop in enrollment was district-wide, except in one corregimiento. As a result two of the 40 schools existing in 1974 were closed the following year. The trend in numbers of elementary school graduates followed a similar pattern. The 1974 high of 207 represented a 30 percent increase over 1970, but the number declined to 167 in 1975.

All but three of these schools - including 96% of the students - offer a 6th grade education (the other three go to 5th grade). In addition, a Basic Cycle Production School 1/ began functioning at El Cacao, near the district seat, in 1973. This practically oriented, lower level secondary school (grades 7th through 9) has 145 students of both sexes, with eight teachers including an agricultural technician and a home improvement specialist. It also has acquired over 100 hectares of land for farm, garden and livestock production (for which it receives credit from the BDA) as well as some farm and laboratory equipment. The school's facilities, and hence its enrollment potential, are being expanded with the assistance of the IDB Education Sector Loan. The closeness of this school to the MIDA offices promotes collaboration among the technicians of the two institutions.

The principal education constraint that will be addressed by the project will be the continued high adult illiteracy rate, as part of the overall education and training effort. Moreover, a special comparative attitude survey among students and parents of the Basic Cycle School and among a control group is planned, in an attempt to measure the impact of the new educational focus on attitudes

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1/ See CAP for Education Loan (043) and Education Sector Assessment.

towards farms, farming, rural living, manual work, etc.

Health and related infrastructure and services are still relatively lacking. In 1974, slightly over 40 percent of the births had medical attention. Only 20 percent of the dwellings in the district had potable water and three communities, in addition to the district seat, had aqueducts. Twenty-six percent of the dwellings had latrines. These averages, however, hide the substantial disparity between the district seat and some of the peripheral areas.

The district seat has a new health center staffed by one physician, a dentist, a nurse, two nurse's aides and one environmental sanitation inspector. <sup>1/</sup> The center provides outpatient clinical services as well as immunization, injections, home visits, health education and environmental sanitation counseling. Its capacity - especially for in-patient care - is not yet being fully utilized.

#### h. Power and Communications

The only electric power source in the entire district is an 85 kw diesel generator, operated by the public power company (IRHE) in the district seat. Its capacity is adequate to cover current demand and small additional requirements. Establishment of local industries requiring more electric energy would require installation of additional generating capacity.

IRHE's current plans for connecting the more remote areas of the interior with the country's power grid do not include the district of Tonosí for the foreseeable future nor is it expected that effective demand for electricity for household use will warrant installation of additional conventional generating plants in other localities during the life of the project. Nevertheless, low-cost alternatives - e.g., wind powered dynamos - may be explored without need for special funding provisions.

Tonosí at present has no post office. Telecommunications are limited to a telephone and telegraph office in the district seat; service of

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<sup>1/</sup> The facility was constructed and equipped with AID loan and grant funds.

the former is extremely poor. Special internal and external telecommunications equipment will have to be provided in the interest of the efficiency of project implementation.

i. Spatial Distribution of Population and Infrastructure

The historical settlement pattern described above, and the isolation of the district from overland communication with the rest of the country until little more than 10 years ago, have resulted in a pattern of spatial distribution of population and infrastructure that needs to be addressed by the project as part of the overall development plan.

The outstanding phenomenon is the maldistribution of population with respect to potential land use capability. Lack of access by the campesino population to the better land owing to the land tenure structure and the scarcity of all-weather access roads appear to be the principal determinants of this maldistribution.

For the district as a whole there are at present only about 50 meters of all-weather roads per square kilometer of total area, plus about 140 km of dirt roads which are impassable during the rainy season. The former are of course the main arteries within the district connecting the principal centers of population, and they include the two asphalt roads that connect the district with Las Tablas.

Another, related constraint arising out of the settlement and land tenure pattern is the enormous dispersion of the existing population (Annex VI, Map 6):

Size of settlement (No. of inhabitants, 1970)	Less than 50	50- 149	150- 249	250- 349	350- 599	600- 1499
Percent of settlements	65	25	6	2	1	1
Percent of population	22	36	19	11	4	8

Of the district's 184 human settlements (in 1970), 167, comprising 58 percent of the population, had fewer than 50 inhabitants; 121 of these with 22 percent of the population, included fewer

than 50 people. Even the village of Tonosí had only about 900 inhabitants, and there was only one other village with a population of more than 350. Many of these settlements are mere informal agglomerations of houses without any pretense of infrastructure, and not a few are completely isolated on small or medium sized ranches, accessible only by foot or horse.

Owing to settlement dispersion and poor accessibility, only five settlements in the entire district are within five kilometers of an all-weather road. The majority of the settlements are more than 10 km. from an all weather road.

This situation is a formidable challenge for integrated development planning. Certain population shifts are entailed by land use and tenure modifications, and a sizeable influx of population can be expected in the medium and long run as a result of the project's impact on economic opportunities and social infrastructure. If the transportation and other economic and social infrastructure are to be provided with a reasonable degree of cost-effectiveness, long-run spatial planning will have to make provision for a far greater population concentration. Creation of a capability for such planning will be one of the project's by-products.

j. Social Structure

The social stratification of the population living, or influencing economic activity, in the district of Tonosí can be inferred in part from the foregoing analysis.

As in certain other parts of Spanish America, the social structure is still determined above all, by the social prestige derived from being a cattle rancher and, by extension, the size of the cattle herd owned. This phenomenon is associated with the transitional nature of economic and social life in the district of Tonosí, where crop farming per se is still largely perceived as the type of subsistence farming on marginal land

described earlier, i.e., an activity of last resort. <sup>1/</sup> Moreover, economic development in the district has not yet reached the stage where a local non-agricultural middle class asserts itself as a dominant class; formation of such a class appears to have been confined to date to the provincial capital.

Owners or occupants of subsistence and infra-subsistence parcels represent the great bulk of the population, as indicated by the land tenure structure discussed earlier. Their source of income is the value for home consumption of the production from their plots and the sale of their labor to operators of larger farms. In combination with the growing numbers of landless farm workers, they will be the main target group of the project. The landless, concentrated mostly in the lower Tonosf valley, are estimated to include at present between 100 and 200 families. They represent clearly the poorest and most disadvantaged of the area's population. However, the definition of "landless campesino" covers a complex social reality which may well defy a conventional development strategy. Preliminary study indicates that a substantial number actually prefer their present status, which exempts them from the problem and responsibilities associated with managing even a small plot of their own.

The social structure as well as constraints and opportunities implied by prevailing attitudes and behavior are discussed in greater detail under Social Soundness Analysis. (Annex V)

k. Social and Political Grass Roots Organization

In accordance with Law 105 of October 1973, and with the Government's explicit policies for local participation in decision making and implementation, certain developmental activities

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<sup>1/</sup> More than 80 percent of the estimated value added by agricultural production in the district in 1970 (see d above) came from livestock. This compares with an overall national proportion of only 26 percent for the same year, even when the export banana subsector is excluded from the calculation.

are to be increasingly promoted by a newly created entity at the corregimiento level called the Junta Comunal. The junta is headed by the elected Corregimiento Representative. Other members are also chosen by popular vote. Proposals for all developmental activities implying more than local self-help must be approved by the traditional administrative body at the district level, the Municipal Council, before they are considered by central government authorities. At a community level smaller than a corregimiento, similar activities are to be sponsored by a junta local.

Juntas comunales have been created in each of the district's nine corregimientos. Some are more active than others. The junta in the district seat, in collaboration with the Municipal Council, for instance, promoted and runs a small cheese plant. Three of the Juntas have had, or continue to have, community agricultural production programs under the sponsorship of MIDA and with financing from the BDA. There are 47 juntas locales.

There are only two cooperatives in the area to date: one is the savings and loan cooperative with headquarters in the district seat which was founded eight years ago and has 463 members. In 1976 it had a \$150,000 loan for beef cattle fattening. There is no agricultural cooperative proper in the district but the active Agricultural Cooperative of Los Santos, with headquarters in the provincial capital, has 60 members from the district of Tonosf. They have an agricultural and a livestock specialist and deal mostly in agricultural supplies. Both of these cooperatives belong to their respective federations (FEDPA and COAGRO) and have applications pending to the BDA's rotating fund under the cooperative development project financed by AID loan 041. There is also a housing cooperative under the sponsorship of the Ministry of Housing. It is expected that all three organizations will play an important part in project implementation.

Joint agricultural production organizations under the agrarian reform program are practically nonexistent in the area. Three asentamientos were created in 1972 but two of them have since

disappeared for a variety of technical and social reasons; part of their membership has joined the only surviving asentamiento ("Cacao") which has only 15 members with 45 dependents. Their joint activities in 1976 were limited to a cattle project including about 130 head on 200 hectares, and 12 hectares of rice.

### 3. The Target Group 1/

The target group of project implementation will be clearly and unequivocally Tonosí district's rural poor, i.e., basically the bulk of those approximately 1000 agricultural families - 55% of the total in 1970 - which, in accordance with preliminary data, have present incomes of substantially less than \$1000 per year. Indeed, whereas the longer term (10 years) planning for full development of the district contemplates the involvement of the entire population regardless of present economic and social status, the initial five-year impact program envisions the concentration of all available public resources essentially on the above-mentioned target group.

#### a. Typology of Potential Participants

On the basis of statistical and field analysis, there are approximately 1600 farms and farm families (out of about 1800) to whom the project will have to address itself in one or another way. These represent basically the following types

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1/ Much of the Project Background which has been presented thus far has been designed to establish the socio-economic situation in which the rural poor in Tonosí find themselves. The present section is not intended to stand alone and does not encompass many important aspects of social and economic conditions of the area's rural poor. An appreciation for these can only be obtained from other parts of the paper particularly the preceding parts of the Project Background and the Social Soundness Analysis.

in order of their numerical importance: 1/

1. Largely subsistence farmers on plots of one to ten hectares of land much of which is marginal for commercial crop farming but who may have small marketable surpluses of produce and who may also obtain cash incomes by wage labor or by "selling" small tracts of recently cleared and seeded pasture to cattlemen. (330)
2. Virtually or completely landless campesinos (less than 1 ha. of land) who live only from wage labor. (300).
3. Beef and/or milk cattle ranchers on parcels of land between 10 and 100 has. located on degraded and overgrazed land that will be reforested or needs rigid conservation (N and RF). (295).
4. Small cattlemen with potentially adequate acreage (20 - 50 has.) on potentially productive grazing land (Cp) whose level of technology does not permit reaching the target net income. (234).
5. Meat or dairy cattle ranchers located on land suitable for semi-intensive grazing (Cp) with fewer than 20 hectares and using rudimentary technology in husbandry and crop production. (110).
6. Small cattlemen (10 - 50 has.) with either of the above characteristics (4 or 5) but located on bottom land suitable for annual crops and without flooding problems (Ca.). (320).

An additional group (#7) for whom some provision will be made, even though some may not qualify as "target group" on income grounds, are the cattlemen with more than 100 hectares on grazing land that will be reforested or at least subject to strictly controlled grazing (N and RF).

Types 1, 2 and 3 - totalling about 925 families in 1970 - will be the priority participants in the project.

1/ The numbers are based on 1970 farm census tabulations and map interpretations (see Annex II E, Table 1). Additional Economic/social Census data are presently being obtained in Tonosí District and will be available by the end of CY 77. These will provide up to-date numbers of potential project participants. Actual participants will, of course, be identified through special field canvasses by project personnel.

The social preference for cattle ranching is expressed markedly among the smaller cattle owners, i.e., generally those with less than 20 hectares of land. Even though many of this class own no more than 4 or 5 head of cattle, and actually spend most of their time in growing subsistence crops, their subjective aspirations are clearly in favor of expanding their cattle operation. With increasing aspirations and the growing need for ready cash, small, extensively managed ranches have been gradually disappearing, but the aspirations remain and they represent a challenge for the project.

b. Incomes and Employment 1/

Based on census data Tonosi's average added value of agriculture production per capita of rural population and economically active population in agriculture (EAP) appears to be close to the national average.

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1/ For statistical detail, see Annex II-F.

	<u>Tonosf</u>	<u>Panama</u>
Gross value of agricultural production <u>1/</u> (1000\$)	3,839	-
Estimated input cost <u>1/</u> (1000\$)	<u>- 984</u>	-
Gross Agricultural Product <u>1/</u> (GAP) (Added value) (1000\$)	2,855	200,400
Rural population (No.)	10,648	751,600
GAP per capita (dollars) <u>1/</u>	268	266
EAP in agriculture (No.)	2,893	187,947
GAP per capita of EAP (dollars) <u>1/</u>	987	1,066

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1/ 1970 prices.

Note: The regional and national data may not be exactly comparable owing to possible differences in the estimation of input costs.

This statistical comparison, however, must be viewed in the light of the facts that (a) the proportion of flat, alluvial soils in the district is five times the national average, (b) the density of population in Tonosí is very low in relation to the potential of the land resources. Moreover, the distribution of agricultural income is very uneven, both in Tonosí and in the country as a whole.

Estimates based on census data for gross production by farm size classes in Tonosí indicate that added value in agriculture (including the value of on-farm consumption) was distributed roughly as follows:

<u>Size of farm</u> (has.)	<u>No. of farms</u>	<u>% of farms</u>	<u>Value added</u> (000\$)	<u>%</u>	<u>Average value added per farm</u> (\$)
Less than 10	788	44.2	347	12.1	441
10 - 19.9	147	8.3	149	5.2	1,014
20 - 49.9	345	19.4	437	15.3	1,267
50 - 99.9	300	16.9	728	25.5	2,427
100 & more	<u>199</u>	<u>11.2</u>	<u>1,194</u>	<u>41.9</u>	<u>6,000</u>
Total	1,779	100.0	2,855	100.0	1,605

When estimated wages paid and earned by the producers (based on theoretical labor requirements of commercial farms and a 1970 wage of \$1.66 per day) in each of the size groups are included, the distribution of assumed net incomes looks slightly less skewed, even when an estimated 124 households of landless campesinos are included:

<u>Size of farm</u> (has.)	<u>Estimated wages</u> <u>paid (-) or received a/</u> (000\$)	<u>Aggregate net</u> <u>family income</u> (000\$) %	
No land or less than 10	246	593	20.8
10 - 19.9	-	149	5.2
20 - 49.9	-	437	15.3
50 - 99.9	- 50	678	23.8
100 and more	<u>-196</u>	<u>998</u>	<u>34.9</u>
Total		2,855	100.0

a/ Based on average 1.52 working members per farm family.

On a per family and capita basis, net income appears to be distributed as follows:

<u>Size of farm</u> (has.)	<u>No. of</u> <u>households</u>	<u>NET FAMILY INCOME</u>		
		<u>Per</u> <u>family</u> ( D O L L A R S )	<u>Per</u> <u>economically</u> <u>active person</u>	<u>Per person of</u> <u>agricultural</u> <u>population</u>
No land or less than 10	912	650	428	138
10 - 19.9	147	1,013	666	216
20 - 49.9	345	1,267	833	270
50 - 99.9	300	2,260	1,487	481
100 and more	<u>199</u>	<u>5,015</u>	<u>3,299</u>	<u>1,067</u>
Total	1,903	1,500	987	319

Thus, more than half the agricultural population of Tonosí in 1970 <sup>1/</sup> subsisted on per capita incomes of \$200 or less, which is the current poverty level accepted by the Government. Relative income distribution in 1976 was probably worse in view of the reportedly growing number of landless campesinos even though rural wages have doubled and there has doubtless been an increase in production.

Moreover, a certain proportion of the crops and cattle shown as produced by the smallest farmers actually accrue to the owners of slightly larger farms who share-crop some of their land in partnership with the former (this phenomenon was not caught by the census).

Finally, the "farm income" calculated for families on subsistence and infrasubsistence farms represents - by definition - almost entirely the value of on-farm consumption. Only one-half of the farms reported any sales at all in 1970, and only 366 farms - or 21 percent - reported sales of \$500 or more. In fact, with the exception of rice, maize and tomatoes, all crop production in the district in 1970 was reported as consumed on the farm. Only one-half the output of rice, and one-fourth of the maize crop, were sold. Sales figures include the cattle ranches (virtually all of which fall into the farm size classes of 20 hectares or more), which sold an overall 44 percent of all the milk they produced and virtually all the beef cattle. Estimated farm-gate value of sales of principal crops in 1976/77 was \$683,000, of which 95% came from a few large rice farms, (one of which was rented by an out-of-district miller).

Total agricultural labor requirements for the district in 1970 at then prevailing levels of technology are estimated to have been about 564,000 man-days, or about 85 percent of the available labor force of about 666,000 man/days. This indicates a global underemployment of 15 percent without considering the marked seasonality of

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<sup>1/</sup> Agricultural population is estimated as 8,929 out of a total of 10,648, i.e., 84%.

demand for labor for crop production (which represented 43 percent of total estimated labor needs). 1/ Underemployment in Tonosí may well have been substantially smaller than the national average, which is estimated at 37% on an annual basis, because of (a) the low density of the population, (b) the fact that landless farm labor, though on the increase, was still a marginal phenomenon in 1970, and (c) the prevalence of dairy farming.

As indicated above, there is also a structurally determined imbalance of labor demand and supply among the various classes of farm size. Over 40 percent of labor availability is found among the families that had no land or who have farm plots of less than 10 hectares. But labor requirements on these plots under present technology are estimated to amount to only 15 percent of total assumed demand. Part of their "surplus" of labor, equivalent to 73 percent of their work force, at prevailing minimum farm wages (about \$3 per day in 1976/77) is "sold" to the larger farms. Moreover, when the assumed overall underemployment - i.e., 102,000 man-days - is applied to the labor force of these families, a 32 percent underemployment rate is found among their approximately 1400 workers. More information on earnings, wages, and on underemployment will be obtained in the on-going 1977 census.

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1/ The estimates are based on locally adapted technological coefficients for the main lines of production, and on the assumptions of (a) an "availability" of only 230 work days per person per year, and (b) that only males are part of the labor force. Both assumptions may well be modified in project implementation.

PART III. DETAILED DESCRIPTION

A. Goal

The goal of the project is to improve incomes, employment and the quality of life of the rural poor in underdeveloped areas. Achievement of this goal entails increasing agricultural productivity and farm production for domestic consumption and export through socially and economically more efficient use of land in accordance with its capability while protecting and rehabilitating soil, water and forest resources. A corollary goal, especially in conjunction with the companion project for the development of rural growth and service centers ("URBE") being proposed for FY 78, is to avoid translating rural underemployment into urban unemployment.

B. Purpose and End of Project Status

In order to contribute to achievement of the goal, the Government has committed itself, as part of its newly conceived regional development strategy, to concentrate resources in a series of local impact areas (at the same time as it continues to tackle other constraints at the national level). The purposes of the project are twofold: first, to help the Government establish an overall institutional capability for planning and implementation of regional impact projects, and second, to help implement a program for the accelerated development of the first of the priority impact areas.

By the end of the project there will exist in the Central Government institutional mechanisms and the capacity to plan and assure coordination and availability of public sector resources in support of area implementation units. At the same time field institutional mechanisms for increasingly decentralized implementation of activities at the impact area level in an interdependent, coordinated and participatory manner will have been established. By the project's end there will exist, at the Central Government level:

- 1) An integrated rural development program secretariat (PRODIAR) within the Directorate General of Regional Planning of the Ministry of Planning and Economic Policy (MPPE), staffed by adequately trained and experienced professionals and auxiliary personnel capable of planning, budgeting, coordinating, monitoring and evaluating development activities in approximately six impact areas and selecting, and indicating strategies for, additional impact areas in accordance with future Government priorities and resource availabilities;

2) A strengthened staff within the Ministry of Agricultural Development (MIDA) preparing operational plans for the agricultural components of rural development projects and supervising field implementation. There will also exist trained and experienced core field staff for implementing a limited number of impact area projects;

3) A Technical Planning and Coordinating Committee recommending projects to PRODIAR and assuring effective coordination of the inputs of the various Government agencies concerned at the central and impact area levels;

4) A High Level Commission (Ministerial level) approving projects presented by PRODIAR, providing policy guidance on impact area selection, budget allocations, etc; and

5) In the Tonosf district, there will exist an integrated implementation mechanism providing or assuring land, water, technical assistance, credit, farm inputs and resource management for the agricultural population, with explicit priority for the rural poor, and also assuring adequate coordination of these services with complementary investments and services of an economic and social nature falling outside the agricultural sector administration.

At the level of the impact area, an integrated development program will have been instituted in the Tonosf district which will have accomplished the following project ends:

1. Minimum net family incomes of about \$2,000 at 1976 prices, equivalent to about \$400 per capita, for most of the approximately 1000 whose average present per capita income is estimated to be about \$140;

2. All-weather road network which places virtually the entire population, as distributed at the end of project, within a maximum of two hours by foot or horse from such roads;

3. An incremental value of agricultural production (including the value added by local processing) at 1976 prices of \$4 million, or about 90 percent over the estimated 1976 level, for the district as a whole, including both on-farm consumption and marketed produce;

4. A minimum of 1500 hectares of hillside land reforested (some for intensive future commercial use and the rest for watershed protection with moderate utilization);

5. Pilot projects of rational economic utilization of natural resources - e.g., sawmill, farm fish ponds, etc., and

6. The existence of a sound economic, social and institutional basis for both broadening and deepening economic and social development of the district over the subsequent five years.

7. While not financed by the loan, additional inputs (from other AID loans and IDB education and road loans) will result in EOPs that are significant in this project's integrated development approach:

a. A water supply and latrine construction program completed, including four aqueducts, eight deep wells, 720 latrines, and an expanded vaccination program undertaken (AID Loan 045);

b. At least 300 housing units constructed for project participants (AID Loan 039 or other government sources); and

c. Basic Cycle Production School is expanded and serving project participants (IDB education sector loan).

d. A 25 km paved road from the town of Tonosí into the underdeveloped and seasonally inaccessible Guánico area (IDB roads loan).

C. Outputs and Inputs 1/

1. Integrated Rural Development Administration:

\$1,411,000 2/

Training 3/ a. Central Administration, Technical Assistance and

(896,000)

1/ Functional breakdown and phasing of funding for all project components are shown in Financial Plan, Part IV-C.

2/ Dollar amounts given at the beginning of each section represent AID loan contributions to the project.

3/ See Part IV-D for a diagram of the mechanism.

Loan financing will be used to train and provide technical assistance to key staff in the MPPE's Directorate General of Regional Development, called Program for Integral Development of Rural Areas (PRODIAR) and in MIDA's Directorate General of Sectorial Planning (DGPS). The training will be in the areas of overall, physical and spatial planning, implementation of rural development projects, institutional and social organization, information systems, evaluation and financial management.

PRODIAR is the key to effective central institutional coordination. Its function are three-fold: (1) planning, budgeting, monitoring and evaluating the rural development projects; (2) serving as the secretariat for both the High Level Commission and the Technical Planning and Coordinating Committee (see below), and (3) providing the central negotiating and implementing mechanism for external assistance directed toward rural development. PRODIAR's staff will be augmented (financed through GOP budget allocation) as its responsibilities increase and as new area projects are developed. For 1977 it has an authorized staff of approximately 12 professionals, assisted by six auxiliary, secretarial and support personnel. Most of these have been with PRODIAR since 1975.

The Technical Planning and Coordinating Committee, composed of the Directors of Planning of each participating Ministry and decentralized institution, will recommend projects for technical consideration by PRODIAR. The Committee will be responsible at the central level for assuring in the projects recommended a maximum integration and complementarity of human, economic, financial and natural resources required.

Staff work on these recommendations will be done by PRODIAR and presented to the High Level Commission for its consideration. The High Level Commission is composed of the ministers or vice ministers of each ministry that participates in the integrated rural development program (Agriculture, Health, Education, Public Works, Commerce and Industry, Planning, and Housing) and of the directors of the decentralized institutions such as the National Institutes of Water Resources and Electricity (IRHE) and of Aqueducts and Sewerage (IDAAN). Based upon PRODIAR recommendations, its functions are to approve project selection, establish policies, objectives, strategies and goals at the national level, and oversee their achievement.

The Commission also reviews the programs of investments and operating expenses for each project. Once approved by the Commission, these expenditures will be part of the national budget. <sup>1/</sup> The Commission is also empowered to approve extraordinary expenditures when required.

The chairman of the High Level Commission is the Minister of Agricultural Development, inasmuch as implementation of the projects at the field level will be the responsibility of that Ministry. It should be noted that the Minister of Agriculture also is the top authority, as Chairman of the respective boards of directors, of the decentralized agencies operating in the sector, such as the Agricultural Development Bank (BDA), the Agricultural Marketing Institute (IMA), the Agricultural Research Institute (IDIAP). The state enterprises into which some of MIDA's operating units have recently been converted - e.g., Empresa Nacional de Maquinaria (ENAMA), Empresa Nacional de Semillas, etc. - will continue to be subject to the direct authority of the Minister.

A special unit will be set up in MIDA's Directorate of Sectorial Planning for coordinating and monitoring the field project implementation and assuring technical backstopping for them. Planning the agricultural components of the IRD projects is already one of the key functions of this Directorate and of the UNDP and AID supported agricultural planning advisory project. The loan will also strengthen the DGSP and the new special unit through additional technical assistance and training in such fields as general project preparation, crop and livestock project planning, and natural resource and land use planning.

b. Information Systems for New Areas

(\$515,000)

The loan will finance the procurement of orthophotographic mapping equipment for the laboratories of the National Geographic Institute and for the training of technicians in its operation. Existence of this equipment in the country will allow Panama to apply this new high precision, and cost- and time-cutting process to all new cadastral and resource mapping without

<sup>1/</sup> It should be noted that even operating expenses related to an official external loan project become part of the Government's "investment budget", making them less prone to axing than the budgets for current expenditures.

having to depend on external assistance. While the most immediate benefit will accrue to the upcoming IRD projects in term of savings in cost and time, the ortho equipment will also produce substantial, similar benefits for other, related development activities; accelerated land titling, 1/ watershed management and reforestation, a thorough aerial survey of the Darien and the Atlantic coast (not included in the 1965-68 cadastral survey), etc. Additionally, the creation of a national capability for fast processing and tabulation of the additional area censuses as a result of U.S. Bureau of Census (BUCEN) assistance in processing the Tonosf census (see below) will save up to \$300,000 in future data processing.

The loan will also finance cadastral and sociological surveys that will be needed in new impact areas identified by the GOP for IRD projects.

2. Tonosf Area Project Development:

\$8,289,000

Loan financing will be used to provide training, key technical assistance, office facilities, equipment and vehicles for the field project staff; complete and update information systems for project implementation; improve the road system; procure farm machinery and construct a storage and maintenance area; construct drying and storage facilities for key commodities; provide farm credit, and fund fire control, reforestation and selected pilot activities.

a. General Field Administration, Technical Assistance and Training 2/:

(\$803,000)

The loan will provide for construction of additional office space as well as equipment - furniture and

1/ See Agricultural Sector Assessment. The number of steps will be reduced from 20 to 4.

2/ The proposed functioning of the field project implementation mechanism in Tonosf and its linkages with the participant population and with the existing administrative structures are shown in Part IV-D, Chart 1.

vehicles, for field project staff, and training and technical assistance in overall project implementation, land tenure and related matters, farm management, technology transfer and producer training and organization, farm machinery management, etc.

The project will have a full-time Area Coordinator (financed by GOP counterpart) for Tonosí who will be located in the area and will be responsible for overall implementation of the rural development projects. The Coordinator will be assisted by a loan financed long-term advisor knowledgeable in the principal technical and social fields concerned and having broad experience in managing land reform-based rural development. Appointment of the Area Coordinator (as well as of future Area Coordinators) will be approved by the High Level Commission, which is also empowered to recommend removal. The Coordinator will be directly responsible to the Director General of Sectorial Planning of MIDA.

The Area Coordinators will have full authority over the project field staff of both MIDA and of the sector's decentralized agencies; they will act as coordinators of the activities of all other ministries and agencies in the project area as they relate to project implementation. MIDA's project field staff will receive technical backstopping and general guidelines from their central and/or regional offices or agencies, but they will be directly responsible to, and follow the directions of, the Area Coordinator for the implementation of programs approved by the High Level Commission.

The Area Coordinator will have a staff of approximately 20 technicians in farm management, crop and livestock technology, watershed management, producer organization, etc., plus appropriate support personnel.

Linkages between the public services and the participant population will be established at two levels:

(1) Through the Provincial Coordinating Council, 1/ which meets once a month, chaired by the provincial governor and including the local representatives of all public agencies as well as the elected corregimiento representatives. (2) Through the creation of an Area Consultative Committee. This Committee will be presided by the Area Coordinator and will include his key staff of technicians as well as formal and informal representatives of all local grass roots organizations, existing and to be created as part of the project. The Consultative Committee will be kept informed at all times of progress and problems affecting the area project development and will constitute a public forum for channeling grass roots participation in project planning and implementation. It will coordinate problem solving at the local level and will collaborate in the evaluation process. Above all, it will promote the participation of local leaders in the project. Existing grass roots organizations such as cooperatives, juntas locales, health committees and parents' associations, as well as those newly created by the project, particularly joint production, credit and marketing groups will be integrated into the system of linkages. While the Mission is aware of the difficulties in getting active participation from Tonosí area residents, the Social Soundness Analysis (Annex V) indicates that, with time, such problems have been overcome in the past.

b. Surveys, Studies and Evaluations:

(\$306,000)

The project will finance a sociological survey, as a follow-up to the recently completed census. The initial survey (Mission grant-funded) and subsequent follow-up surveys (AID loan) in years 1, 2 and 5 of the project (to be contracted by PRODIAR) will yield essential information on attitudes and values. This information will be correlated with key variables from the census and will serve for both project implementation and evaluation.

Field collection of census data has been completed and, along with data entry for processing and technical assistance and initial programming of tabulations by the BUCEN, is

1/ In order for decentralization to be successful, regional-level decision-making bodies with the power to program and complement area development projects and the means to articulate the client population's needs at the national policy-making level will have to exist. While not critical at this point since Tonosí is the first impact area it will become increasingly important as other area projects are implemented.

being financed by Mission technical support funds. The data to be provided by the Contraloría General, Department of Statistics and Census, will be processed by the Regional Staff, Bureau of the Census in Washington, D.C. In order not to delay contracting, and thus assure that the contracted tabulations will be available in Panama before the end of 1977, authorization is requested to disburse loan funds immediately upon Loan Agreement signing for expenses incurred after the Loan Authorization. Programs will be provided for the Contraloría by the Census Bureau for additional data processing as required and to enable the Contraloría to process future area censuses on their own equipment (see 1.b., Information Systems, above). (A total of \$90,000 has been included for the additional BUCEN work - processing and providing additional programs.)

The loan will also fund a cadastral mapping exercise to gain information on land tenure changes since the 1965-68 survey and to identify important land use shifts that have occurred over the past eight years (most importantly, further encroachment on forest lands). The information will also be used to establish and maintain a property register. Never done with the 1965-68 data, such a register will be one of the institutional innovations to be tested at the area level for more widespread future application. More precise and current mapping is needed also for micro-physical planning, implementation of land redistribution and accelerated titling. Aerial stereophotography of the area has already been completed by the National Geographic Institute with 1977 GOP budget funds. Laboratory work including ortho-photographic mapping will be done by a Central American sister institute at cost. <sup>1/</sup> All information is expected to be available in early 1978. In order to make this possible, authorization is requested to disburse loan funds to reimburse the Government for expenses incurred for a contract or agreement entered into after Loan Authorization but prior to the execution of the Loan Agreement.

Additional specialized natural resource surveys, also to be initiated during the first year, are described below (see d-i and f below).

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<sup>1/</sup> The orthophotographic equipment to be procured for the National Geographic Institute will not be in place in time to be used for the Tonosí area.

c. Land Redistribution and Resettlement 1/

Approximately 10,000 hectares of land are estimated to be required for settling and resettling the various groups of prospective project participants (totalling 900-1000 farm families), including the equivalent of about 2,100 hectares of first class cropland 2/ and of 7,000 hectares of first class grazing land (see Annex II-E, Table 2 and Annex II A and C, Comparative Farm Budgets).

The general location of the land to be redistributed has been identified from the 1975-76 MIDA tenure survey, based on 1965-68 cadastral mapping. Exact locations will not be known until the current census and cadastral exercises have been completed (see above) in early CY 78. The precise land area required will depend on the actual number of participants and on detailed land capability assessment.

All land to be acquired for the project, even though it may be de facto occupied, is legally in the public domain. The approximately 26,000 hectares of yet untitled land turned back by the United Fruit Company in the 1950's (see Part II) are expected to yield the bulk of this land; they are largely contiguous and have a high average production potential (see Annex VI, Maps 2A and 10).

In accordance with the Agrarian Code, MIDA's Directorate General of Agrarian Reform (DGRA) may issue permanent title to up to 50 hectares of public land (regardless of land capability) to each qualified claimant (i.e., someone who has filed claim for the land, has been on the land and had it in productive use, etc.), and temporary rights to an additional 200 hectares. For the purpose of the project, DGRA will canvass all occupants of public land and survey their holdings, on the basis of the updated cadastral mapping. Title to the maximum

1/ The entire cost of the land redistribution and resettlement, estimated at approximately \$2.5 million, will be a GOP counter-part contribution to the project.

2/ This assumes that 400 hectares of irrigable land can actually be obtained; if not, total rainfed cropland requirements will be up to 4,000 hectares.

50 hectares will be granted to each lawful claimant. These will number no more than about 150. The bulk of the land will probably be acquired from about 30 of these occupants who hold a total of about 10,000 hectares in Zone 1 in blocks of more than 200 hectares (see Annex II-F, Table 9). The remaining 100 occupants hold another 12,000 hectares in this zone. Of these 22,000 hectares, only 6,500 hectares will be required to provide all of the 150 occupants with 50 hectares each (assuming they do not already have title to that much land). This will leave at least 15,500 hectares for redistribution to the project participants.

In addition, there are 36,000 hectares of untitled, occupied land in parcels of more than 50 hectares in the other three zones of the district. These are mostly outside the former United Fruit land, and a substantial proportion of the land is probably not suitable for farming or grazing. Nevertheless, it represents a sizeable reserve that may well be affected if inter-corregimiento movement of participants is to be avoided.

In accordance with existing legislation, no compensation is required to be paid for public land occupied without legal title that is to be reincorporated into the public domain for redistribution (or for other public utility), except that permanent improvements effected by the former occupant will be appraised and compensated under established norms and practices; compensation is provided in the form of 20-year, 6% bonds.

The average estimated value of the improvements is \$150 to \$175 per hectare. 1/

Small areas of private land with title may have to be acquired in local cases where insufficient untitled land is available to create the production units for project participants. In those cases, established legal procedures will also be followed: a purchase price representing the average between the market price and economic productivity appraisal will be offered. (The purchase price would amount to \$400-\$500 per hectare for cropland, and \$250-\$400 for grazing land.) If this is not accepted by the owner, DGRA can resort to expropriation at cadastral value.

As in the other land redistribution schemes in recent years, allocation of land to land grantees will at first be provisional. This is necessary because of the inevitable attrition

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1/ The market price for improved pasture on average land is about \$350.

rate among land grantees and project participants. A certain delay in awarding of titles will also permit families who opt for participation in a joint endeavor to have some experience in joint management before having to decide whether to opt for individual titles or some type of joint ownership. Most important, participants will be given to understand that allotment of land in the project will not be an end in itself but merely the basis for full participation in the entire range of development activities provided by the project. This implies that any land grantee who, after a suitable interval of perhaps one or two years, does not demonstrate capacity or willingness to become a full participant may have his land grant withdrawn in favor of another candidate. All such proposals will be submitted to the Area Consultative Committee for adjudication; where the participant concerned is a member of a joint tenure or production group, the recommendation of such group will constitute the fundamental basis for final action. In cases where groups of participants agree to pool their land, the decision of whether individual or collective title to the land will be issued will be left to the participants with advice from the Project Area team. 1/ Moreover, these decisions will not be irreversible. Legal methods exist for dissolving or severing joint tenancy arrangements if one or more of the families involved so desire.

In all cases of joint tenure or management, a family subsistence plot will be provided and its dimensions will be such as to represent a partial outlet for surplus family labor without affecting availability of labor in joint farming enterprises during peak periods.

Agrarian reform legislation enables the Executive branch to decide whether land is granted or sold to reform settlers. However, if it is sold, the price may not be less than \$6 per hectare; payment may be made over 20 years (30 years if there are improvements) without interest. 2/ Project participants will be expected to repay the full appraisal

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1/ Lack of title is no obstacle to the granting of medium or long-term loans by the BDA in case of agrarian reform participants. A certificate from the DGRA is sufficient.

2/ Interest is collected only on delinquent balances.

value of the improvements. In view of the 30-year interest-free repayment period, annual payments for land, after a suitable grace period where necessary, will not tangibly affect projected net family incomes and cash flow, as shown in the farm budget analyses, even without considering the effect of inflation. (Participants may, of course, repay the charge for the land faster if they so desire, in order to obtain free and clear title sooner.)

The approximately 1,000 families of types 1, 2, and 3 (see Part II, C, Target Group, and Annex II-E, Table 1) will be the priority participants in the land redistribution and resettlement.

The general strategy for groups 1 and 3 will include incentives for abandonment of subsistence or grazing plots on commercially marginal land. These incentives will represent the very essence of the project for all three priority groups, i.e. the provision of an adequate resource base on land capable of supporting semi-intensive crop or cattle farming along with training, technical assistance and credit.

Compulsion to abandon presently occupied land will not be applied except where it is determined by the Project Area Team that the continued agricultural activities of the campesino family concerned in the area would represent a serious impediment to the resource protection and rehabilitation program.

Owners or occupants of marginal subsistence plots will be compensated for the appraised value of their interest in the land and/or fixed improvements including dwellings. The value of the compensation will be deducted from participants' obligations for newly allocated land.

In view of the low educational levels and limited managerial capability of the group 1 and 2 priority participants (approximately 650), the strategy of the Project Area Team will be to encourage the organization of small, socially compatible groups into joint farming schemes. The purpose of such organization is not merely the attainment of conventional "economies of scale" in farm operation, but also economies of scale and greater cost effectiveness in the supply of public services and inputs. Perhaps most importantly, such groupings are designed to overcome the managerial inexperience and possible aversion to risk-taking among the majority of participants. The Project Area Team will work through identified natural leaders in the groups, gradually

introducing new technologies and managerial practices leading to substantially higher income levels. While this will be the general focus for development of the crop farming participants, it will not be applied rigidly or indiscriminately. Wherever individuals demonstrate clear preference they will be allotted individual farm plots, even though they may participate in group schemes for delivery of public services and resources.

A certain proportion of these two groups, particularly among the completely landless, may not wish to participate directly in the development scheme. To the extent that they prefer to remain independent, unattached day laborers or obtain permanent employment on middle and larger size farms or ranches, they will of course be left free to exercise such a choice. The overall reduction in the supply of labor for hire that is expected to result from the project in a relatively short run will provide greater employment opportunities for such individuals and will also tend to raise wages.

Small cattlemen of type 3 (approximately 250), who ought to be removed from degraded land subject to reforestation or rigid conservation measures will be resettled in principle as milk/beef producers (see below), on grazing land with a potential carrying capacity of about two animal units per hectare under technological and management practices to be promoted by the Project Area Team. Each operator will be provided with approximately 20 hectares, either individually or jointly with other families. They, too, will be compensated for present land holdings and/or fixed improvements and the value will be deducted from their obligation for project land assignment. Their existing cattle herds will be sold and better stock will be procured in accordance with the development of new pastures. As determined by the Project Area Team, compulsion will be applied only in cases where incentives are insufficient and where continued cattle grazing will jeopardize conservation and/or reforestation measures to be undertaken during the life of the project. However, where members of this group agree to participate in strictly controlled conservation and grazing practices (on land where such measures are practical), they will be permitted to retain part or all of their present holding. Those who do not wish to become project participants will be compensated in cash. Small cattle raisers who hold less than 20 hectares of good grazing land (group 5) will be allotted additional land.

While the majority of these small ranchers may prefer to manage individual enterprises (see Annex V), joint ranching schemes of at least four families each will be encouraged, mostly to take advantage of internal and external economies of scale. The most important among the former are more rational pasture rotation and the joint use of watering facilities and equipment and installations for forage conservation. The possibility for combining ranching with some commercial cropping, 1/ is also contemplated.

Efforts to promote group farming or ranching among the priority participants will emphasize above all the identification of innovative, flexible and culturally adapted forms of association. Use of heavy machinery for soil preparation, planting, harvesting and other operations will be one incentive for pooling land resources in some way. The reduced cost of fencing (and the obstacles to movement of machinery that fencing of individual parcels represents) will be an additional incentive, in both crop farming and cattle raising, and especially in mixed farming areas. Technical assistance and credit will also be provided typically on a group basis, in part as one of the tools in an intensive educational effort to make the participant population aware of the advantages of cooperation and joint action. This, plus the flexibility that will prevail in allowing participants to choose the kind of joint enterprise that will best suit their desires, will represent a fundamental departure from the rather standardized and rigid asentamiento pattern that has been imposed on agrarian reform beneficiaries since 1970.

To forestall some of the typical problems encountered in group farming, certain general guidelines will be established during implementation with a view to avoiding foreseeable conflicts among members of joint production groups. These guidelines, to be developed by the participants with assistance from the Project Area Team, will deal essentially with criteria for establishing rules for allocating work and net profits; the use of jointly owned operating capital and inputs; procedures for admitting and separating members; limited (e.g., one-crop and/or one season) joint activities; the use and abuse of group credit, etc.

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1/ Virtually all project participants will presumably be growing some crops for family consumption.

The Project Area Team will draw on experiences of other countries (e.g., Honduras, Mexico, Venezuela, Colombia, Peru). Moreover, the Project will try to take advantage of the group farm management training and planning projects currently being supported by the Government of Israel/IDB and by the IICA.

Physical and social dislocation related to land use shifts and land redistribution will be kept to a minimum. The distances over which participants will have to be relocated will depend on the actual need and availability of land for redistribution in their immediate vicinities. The present dwellings of the target group are for the most part extremely primitive; temporary shelter using local materials found on the land can be reconstructed quickly by them until more permanent housing is available. Such housing will be provided gradually for all those who wish to upgrade their dwellings (and to assume the respective obligations), from resources outside the project (see Section E below). In accordance with the Government's policy of consolidating rural villages, these resources will be available for areas in which population nuclei are of sufficient size to provide basic services. These basic services (mainly streets, latrines and water piping) are routinely included in the rural housing construction and the allocation of such costs is reflected in the mortgage. Priority in the construction of Ministry of Health aqueducts (also from resources outside the project) will be given to these new settlements. Wherever necessary, transportation of the families and their modest effects will be provided, procured or contracted, by the area project administration, free of charge or at nominal cost. Provision will be made in the GOP budget for this contingency.

d. Agricultural Development: (4,924,000)

The project will finance all the inputs (e.g. farm machinery procurement, credit for all farm inputs, and storage facilities) to produce at the projected levels (see Part IV, Project Analysis). The production program estimates a participation of about 900 families out of a total potential target group of about 1,000 (100 dairy farmers will be financed by the IBRD-funded ranch development program administered by the BNP), all of whom will be recipients of land allocations in the project. Of these, 650 are expected to be growing crops and 250 will be dairy farmers who will also sell surplus calves and cull cows.

Programming of agricultural production was based on a series of considerations including: a) minimum

target income per family; b) natural resource endowment and its most efficient use; c) local custom; d) applicable technology and possibilities for its transfer; e) productive employment of participants, and f) markets.

The resulting five-year program for the priority participants comprises seven rainfed crops, three irrigated crops and milk and meat (Annex II-E, Table 2). In accordance with the proposed phasing of land redistribution and resettlement (see Part V), the end-of-project acreage goal will be reached by year 5 for all crops, and for about 85 percent of the pasture improvement. Sixty percent of the crop acreage targets will be met during year 2 (1979/80), 85 percent in year 3 and the balance in year 4. Since the last 15 percent of the cattle units are not expected to be created until year 4 of the project, the full acreage of improved pastures of the project will not be developed until the end of year 6, i.e., one year after final disbursement of the loan. Physical yields and net farm incomes of the latter may be slightly higher after full development.

Based on local custom and the relatively high topographic concentration of land capability, project participants will be in principle either crop or dairy farmers for purposes of commercial production. This will probably be truer for individually managed farms than for groups, because the larger acreage of the latter, as well as individual inclinations among group members, will tend to make mixed crop-cattle enterprises more feasible.

The production targets (see Part IV A) will be achieved through the combined impact of the project inputs: qualitatively and quantitatively adequate land; intensive assistance in farm technology and management and in social organization; sufficient and timely credit for investments and operation on realistic terms, and sufficient and timely availability of farm inputs including machinery services. These services will be provided by the team of technicians to be fielded under the direction of the Area Coordinator operating as a unit, with the technical guidance and backing of the regional and central organization of the respective ministries and institutions. This level of assistance will be phased down during the life of the Project and moved to other impact areas as new IRD projects are implemented.

Most of the inputs will be furnished by public or semi-public agencies during the life of the project.

However, the Project Area team will be testing and, if feasible, promoting the creation of producer organizations capable of assuming increasing responsibility for these services over a ten-year period. Provision for this will be made in the project staffing and in the farmer training program.

The Area Coordinator and the Project Team will provide needed technical inputs in a variety of areas. A technical nucleus consisting of specialists in crops, livestock, farm management, soil and forestry, social development and organization, and credit will direct operations under the Area Coordinator. Junior level field teams will be responsible for direct contact with project participants and will be backstopped by the technical nucleus. The latter, in turn, will be able to draw on technical guidance from the regional staffs of participating ministries and institutions at Las Tablas as well from senior specialists in the respective headquarters. The junior level teams will be outposted wherever substantial concentrations of project participants are not easily accessible from the Tonosf headquarters. (In Panama, this will be an entirely novel manner for providing and managing needed agricultural inputs in such areas as applied field research, training, technical assistance, credit planning, etc.)

Assistance will be provided through the long-term advisor to the Area Coordinator assisted by short-term specialists and backstopped by other specialists assigned to MIDA's Directorate of Sectorial Planning and by the one-year advisor to IDIAP being contracted with Mission Technical Support funds. Project-specific technical assistance will emphasize above all farm management, technology transfer and producer organization. Training activities will consist of short and medium-term observation trips of selected personnel to countries where integrated research/extension programs with a small-farmer focus are being successfully implemented or developed (e.g., Mexico, Guatemala) and of short local in-service courses to be conducted by national specialists and external technical assistance personnel. 1/

There follows a more detailed description of the kinds of inputs that will be provided by the Project Team and others.

1/ Technical assistance and training costs are included in 2.a.

### i. Technology

One of the first priorities of project implementation in Tonosf will be the design and initiation of an applied research program to determine optimum input combinations and management practices for the crop and livestock enterprises with special reference to local soil conditions. Wherever soil information is incomplete for areas expected to be included in project farm development, soil samples will be taken and analyzed on a priority basis by IDIAP's soils laboratory at Divisa. (The project budget includes provisions for funding of this activity.) While the design of the research program will be the technical responsibility of IDIAP, the objectives and focus of the program will be agreed in detail with the Area Coordinator and the project team. All project team members will collaborate in the research program, especially inasmuch as the gathering of information on customary practices and technological problems of farmers and ranchers in the area will represent an important input for the research planning. Farm management specialists will be included in all teams in order to assure an adequate economic focus for the research design and results.

The GOP and the Mission are fully aware of the desirability in principle of introducing capital intensive technology only where it will tend to enhance, rather than displace human labor that would otherwise be unoccupied. However, technological considerations related to climatic factors and maximization of yields from the entire input package impose some constraints on the practical application of the principle in the case of rice in Panama (see Part IV A 1). Moreover, the opportunity price of labor in Panama is much higher than in other Central American countries. Thus, while little allowance has been made for machinery saving in the case of rice, this has explicitly been considered for all other crops.

In the case of basic grains (rice, corn, sorghum and cowpeas) the highest level of biological inputs used under Panamanian conditions will be adopted from the beginning. In the case of rootcrops, modern technology will consist essentially of gradually increasing biological inputs. Improved management practices for cattle will be introduced in annual stages. The yields projected during the life of the project may well be exceeded in many cases without raising input costs if the project achieves the right combination of adaptive local research and better management of the inputs.

More detailed plans for dairy herd and pasture management will be prepared during the first year of project implementation in order to assure that all known - and socially feasible - technological and management improvements will be considered in farm development. The experience acquired by the technical personnel of the Banco Nacional de Panama (BNP) in developing small-scale cattle enterprises, especially for milk production, under the livestock loan of the IBRD (a follow-on loan is about to be implemented) will provide important technical guidance for the project personnel. This guidance will be furnished by the same personnel who will be directly administering the credit-technical assistance program for a portion of the project participants (see following section).

ii. Credit: ( \$3,024,000)

All credit provided by the project will be administered by the Agricultural Development Bank (BDA), through its local Tonosf office. A rotating fund will be established to the account of the Tonosf office, from which disbursements will be made as required against commitments for farm investment and production plans for each individual or joint enterprise. 1/ This PRODIAR revolving fund will form the basis for similar AID projects planned for future years. Repayments to the fund over and above the needs of the Tonosf district will be made available, as needed, for future AID/PRODIAR projects. The credit program is designed to fully finance all investment and operating costs for project partici-

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1/ The interest rates will vary, in accordance with prevailing BDA rates (currently eight to ten percent plus a half to one percent handling fee). Interest and repayment terms and conditions will be adapted flexibly to each type of activity.

pants during the life of the project. 1/ For crop production enterprises, the bulk of the credit will be for annual operating expenses. In the case of capital investments, which concern mostly the dairy ranches, longer term credits will be available. 2/

Allowance has been made in the credit requirements for temporary subsistence credit, i.e., advances for the participants' own labor input, since project participants are typically either subsistence farmers, farm laborers or poor ranchers who do not have any savings. The equivalent of the presumed labor input will be authorized during the first year for

- 1/ Approximately one-third of the potential dairy ranchers among project participants (about 100 producers) will receive both credit and technical assistance under the IBRD-funded ranch development program administered by the BNP. They will be among land recipients of the project and will also benefit from project infrastructure. In principle, these ranchers will have cattle herds of 20 or more head and can thus not be properly classified as "poor". Nevertheless their technological resources and their access to adequate land and credit are in general insufficient for reaching the target income established by the project. The BNP and the IBRD welcome the opportunity for developing such a large number of ranches in a small, concentrated area with the general support of the project. (As discussed earlier, the BNP team is also expected to provide technical guidance for project technicians for the development and management of the ranches that will be full project participants.)
- 2/ Except for defaults or refinancing of loans, advances for operating expenses are expected to be fully repaid into the revolving fund annually. In case IMA is short of cash at harvest time, BDA borrowers will not be charged interest on their outstanding crop loans beyond the date on which produce is received from them by IMA. However, the GOP will assure that IMA's payments are not delayed for periods that would affect the liquidity of BDA's Tonosí revolving fund at a time of peak demand for farm credit.

new participants in any crop farm enterprise (regardless of whether individual or collective). However, such credit will be scaled down to 50% and 25% in the second and third years, respectively. No advance for participants' labor will be authorized beginning with the fourth year. These advances are considered production credit for crop enterprises and will be repaid annually. In the case of dairy ranches, the labor input has been estimated for investment purposes only; the advances, spread evenly over the first two years of ranch establishment (for which the farm budget shows insufficient net cash inflow for family subsistence), will be repaid as part of the investment amortization schedule. (For details, see Part IV B 3 and Annex IID, Table 8).

On an incremental funding basis, average credit per project participant in crop farming will be about \$2,700 during the life of the project, including the labor advance which will average about \$1,000 on the same basis but which will in fact probably not exceed \$500 per year for each producer. Projected credit requirements for dairy farmers will average about \$12,000 for essential investments in fencing, pasture improvement, watering and forage conservation facilities and especially in cattle purchases. These planned investments have been held to the minimum required to establish a viable enterprise for poor campesinos who already own an average of about five head of cattle, on the basis of the simple and labor-intensive technology envisioned for the dairy farms; moreover, cash proceeds from the sale of the existing scrub cattle belonging to the average dairy participant have been included in the cash flow, and the credit program contemplates financing purchase of only one-third of the number of cows that will constitute the herd at full development.

Each credit plan will be designed by the respective members of the Project Team including the farm management specialist, with the advice and concurrence of the BDA's financial analyst, and in the framework of an overall long-term farm development plan rather than as a discrete "loan project". A file will be established for each project participant which will contain not only financial information but also the long-term farm plan and sufficient basic infor-

1/ The average \$12,000 compares with a projected average investment credit of \$25,000 under the second IBRD cattle loan for improvement of going dual-purpose enterprises with an average of 50 hectares of pasture.

mation to allow annual evaluation on an individual and aggregate basis. This, inter alia, will reduce to a minimum the need for lengthy discussions in the credit committee leading to formal loan approval. Moreover, participants or groups will be provided with a simple record booklet in which they will be obliged to register all expenses and sales, as well as animal births and deaths, and which will allow a simple form of management analysis. In cases where there is no member in the family or group sufficiently literate to maintain such a record, a member of the project team will assist the producer in maintaining this record on a regular basis. The year-end results of the register will be entered in the participant's files in the BDA office.

The credit plans will be approved in the first instance by a special project area credit committee. This committee will be composed of the Area Coordinator and his director of technical assistance, the local manager of the BDA and an elected representative of the participants, with ad hoc membership of the field technician or technicians directly responsible for developing the credit plan. Formal approval of all loan commitments in excess of \$1000, whether for individuals or groups, will be given by the existing Regional Credit Committee of the BDA. The BDA's regulations will be suitably amended to permit approval at this level of individual loans up to \$15,000 and group loans up to \$60,000.

The Area Credit Committee will exercise strict vigilance over the repayment record of both individual and group borrowers and will recommend withdrawal of participant status from those whose repayment record shows willful negligence.

An experimental, limited credit insurance reserve will be created, designed to promote the adoption of income-enhancing technological innovations - including novel lines of production - by overcoming risk-taking aversion of potential innovators among the participants and their groups. The reserve will insure such loans against risk of environmentally or economically caused loss. Projects may be presented by participants or groups of participants and will be screened by the Area Credit Committee, which will forward a full report through the Regional Director of MIDA and the Regional BDA Credit Committee to the BDA's central credit committee and AID for final approval. The reserve fund will be part of the AID loan item earmarked for Pilot Projects (see below) and will be used to reimburse the BDA promptly for any losses incurred under this incentive program. The unexpended balance of this reserve (to be

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set at \$100,000) at the beginning of year 5 of the AID loan will be used for directly funded pilot projects or will be used for the general PRODIAR revolving fund, including similar reserves in new project areas.

In order to promote thrift and help avoid perpetuating demand for official, subsidized credit, the creation of savings and loan associations will be encouraged and the BDA will endeavour to establish checking and savings accounts for joint production and cooperative marketing groups as well as for individual participants. (This effort will not require special funding by the Project.)

iii. Farm Machinery: (\$700,000)

A machinery pool for crop production and harvesting equipment will be established in Tonosf (in time for initiation of the first annual production plan in 1979). It will be managed and controlled by the project area coordinator with the assistance of MIDA's machinery service, the Empresa Nacional de Maquinaria (ENAMA). The project will finance the procurement of farm machinery. 1/ Analysis of machinery requirements by seasons in accordance with the phased crop production and pasture improvement plan (see Part V, Implementation Plan) indicates the peak operation needs. (Equipment to be purchased with loan funds is listed in Annex IIE, Table 6). In addition, a machinery storage shed and a shop for maintenance and minor repairs 2/ will be constructed and equipped. In order to assure adequate programming, operation, maintenance and repair systems, technical assistance will be provided.

The personnel of the machinery pool, including tractor operators, will be recruited insofar as feasible from the project target population; they will be trained at ENAMA facilities and/or by equipment suppliers.

1/ Small-scale farm machinery and equipment for individual or joint operations will be financed through the BDA's credit program.

2/ Major repairs will be performed at ENAMA's central facility in Santiago.

Provision has been made in the farm credit program for financing and immediate payment of rental fees for work performed by the machinery service at standard (1976) ENAMA rates which approximate commercial rates. The annual amortization and operating cost of the machinery pool will be covered by rental payments from project participants and from other farmers in the area, who will have access to the machinery service whenever the requirements of project participants will have been satisfied. The machinery pool will also be reimbursed for maintaining and servicing the Municipality's road maintenance equipment (see e. below).

iv. Storage Facilities: (\$1,200,000)

Market analysis (see Part IV-A) and projected yields of the project financed activities indicate that certain additional facilities are needed (beyond Panama's present capacities) for cleaning and drying of rice and drying and storage of onions. In order to provide for the marketing of the projected output of onions from irrigated farming in the project, two additional drying and storage modules will be constructed in Aguadulce (approximately two hours by truck from Tonosí). These modules consist of five 150 short-ton storage units each and will supplement, and be identical to, the one being constructed under Loan 042 to handle the output from the provinces of Coclé and Herrera. The modules will be located in Aguadulce because the land is available and it will be more efficient to operate two facilities in one location than to split them up into two locations.

A tempering bin and a drier for rice will be installed at Las Tablas. These will supplement the six bulk storage bins to be in place at a new IMA facility in 1978 (with Loan 042 financing) which was designed only for feed-grains, and thus without a rice drying facility, because little rice is currently being produced in the area.

In addition, three 8 x 10 meter bins will be added to the machinery pool facilities at Tonosí to serve as a collection point for bagged produce, including corn, cassava, yams and plantains.

The GOP will assure availability to IMA of sufficient inventory capital to purchase and store the bulk of the onions to be produced in the project and approximately 20% of the rice.

#### v. Other Inputs

Additional needed agricultural inputs - e.g. domestically produced seed, as well as fertilizer, agricultural chemicals, small equipment, etc. - will be supplied through the Federation of Agricultural Cooperatives (COAGRO). <sup>1/</sup> Seed will also be supplied by MIDA's Empresa Nacional de Semillas which multiplies seed certified and/or developed by IDIAP and the Faculty of Agronomy.

Routine supplies of these inputs will be stored at the COAGRO warehouse at El Espinal on the main highway north of Las Tablas, approximately one hour from Tonosí by truck. Small storage rooms will be included in the design of the farm machinery storage shed for certain supplies that must be more readily available in the project area.

The Cooperativa Agropecuaria Santeña, a COAGRO affiliate with headquarters in Las Tablas, may also participate in the supply of inputs. It already has about 50 members in the Tonosí area and is expanding its storage facilities. In any case, both COAGRO and MIDA are committed to promote a multi-purpose second-degree cooperative for project participants as soon as they are convinced that a sound basis exists. Input supply would be the initial function of such a new organization.

The livestock specialists of the Project Team will supervise the purchase of cross-bred milk cows for the dairy ranches. They will be purchased from MIDA's dairy herd at El Ejido near the town of Los Santos, and from the herd being established at the PRODHEIRA development project at Rio Hato (partly financed by the new IBRD livestock loan). Pure-bred Holstein and Brown Swiss bulls will be procured preferably from these two official institutions. Purchase may also be made if necessary, from reputable private herds. The numbers required are not large enough to necessitate imports of bulls or cows.

#### e. Road Improvements <sup>1/</sup>: ( \$1,625,000)

Project funds will finance the upgrading of approximately 12 dirt road sections (totaling about 80 kilo-

<sup>1/</sup> For detail of road selection criteria, construction and maintenance, rationale, and the list of roads to be financed, see Part IV B.3.d and Annex III.

meters) to all-weather gravel surfaced roads. 1/ The establishment, at the earliest, of a minimum network of all-weather roads is considered essential to project success.

Nearly 70 percent of the district's existing network, or 141 km, consists of earth surfaced roads without culverts or bridges and with man-made fords that are passable only by four-wheel drive vehicles (if at all) during much of the rainy season. Local officials are of the unanimous opinion that the condition of the roads has been a principal deterrent to more rapid agricultural development of the district. This is especially true of milk. 2/

Road improvements will be under the direction of the Ministry of Public Works (MOP) through its National Directorate of Construction (DNC). The regional director of MOP will implement the program in consultation with the Area Coordinator of the project. Most of the work is expected to be performed through local private contractors. The contracts will require maximum employment of unskilled local labor. This will apply particularly to masonry, ditching, culvert excavation, and spreading of gravel. However, in accordance with Panamanian practice, and in view of relatively high labor cost, the absence of a large pool of unemployed in the area, and the seasonality of the work, major earth-movement, grading, shaping and surfacing will be performed by road equipment.

f. Watershed Management and Reforestation:  
(\$386,000)

In order to achieve one of the major aims of the project - more rational land use - systematic and integrated watershed management and reforestation are included.

MIDA's Directorate General for Natural Resources (RENARE) will have technical responsibility for this

1/ Improving these dirt roads to minimum all-weather standards, rather than pioneering new roads of the same standards, represents a saving of at least one-third.

2/ Milk production increases during Panama's rainy season - April-July - when more and better forage is available. However, the volume of marketed milk declines in some areas of Tonosí due to the inability to get it out of some milk producing regions.

project component. RENARE will have a small cadre of professional and technical personnel in Tonosí to administer component activities under the over-all direction of the Area Coordinator.

The major elements of this component are: (1) reforestation of approximately 1,500 hectares of the most severely degraded land; (2) low-cost forest conservation measures designed to reduce indiscriminate slashing and burning of remaining forest and brush cover as well as of newly reforested land; and (3) activities necessary to implement sound soil and water management practices.

The highlights of each element are discussed below: 1/

i. Reforestation (\$297,000)

The objective of this component is to maximize economic returns on land which, for ecological reasons, is not appropriate for farming and ranching activities. A major reforestation program will be initiated. The long-term goal is to reforest approximately 21,000 hectares of degraded land, 1,500 hectares of which will be financed by the project. The land will be replanted with fast growing species such as Caribbean pine, Eucalyptus and Gmelina arborea, which are well-suited to the area. These reforestation efforts will be instituted on a permanent basis and will be continued beyond the life of the project. Most reforestation will occur on public land in the Corregimientos of El Cortezo, La Tronosa, Flores and Altos de Guera.

Since Panama has no tree seed production facility yet, a nursery for the selection and reproduction of seed of native species will be established for the benefit of the Tonosí Project and other integrated rural development projects, and possibly for other reforestation projects in the country.

ii. Forest Conservation (\$74,000)

In order to prevent the continued destruction of forest and brush cover, a fire prevention and control system will be introduced, and utilization of remaining forest lands within the La Tronosa forest reserve will be more strictly controlled. Local personnel will be trained (with the help of short-term technical assistance inputs) as forest guards

1/ For detail, see Annex IV.

who will be charged with forest fire prevention and control. In addition, the trained personnel, through informal educational programs will make the population aware of the importance of forest preservation.

iii. Soil and Water Management (\$15,000)

An active program in soil and water management will be initiated early in the life of the project in order to evaluate, control, maintain and recover the soil and water resources of the district. Activities will include a series of surveys as well as activities designed to provide an immediate improvement in water balance within the watershed. Specific activities to be undertaken are:

- a hydrology study will provide basic streamflow and ground-water data required for future implementation of potential irrigation schemes (mini-dams, tube-wells) as well as to permit adequate planning for the future of water resource utilization in the district;

- a limited, detailed soils inventory will be prepared in order to facilitate micro-level land-use planning on the farms of project participants and in areas subject to reforestation (see Agricultural Technology above), and

- streambed cleaning, i.e. removal of tree trunks and branches, will permit a more rapid run-off of rain-water and will reduce the severe flooding during periods of heavy rainfall. Approximately 70 km of streambed will be cleaned during the project implementation period.

g. Pilot Projects: (\$245,000)

In order to allow for the identification and development (by the Project Team in conjunction with field staff of Ministries and other institutions) of additional income producing activities in the project area that maximize efficient resource utilization, funds will be set aside to finance pilot projects. (The allocation includes a \$100,000 temporary reserve for the high-risk farm credit program discussed under d-ii above.)

As ideas are generated by the field staff and/or project participants, they will be brought to the attention of the Area Coordinator. To determine the technical

and economic feasibility of the idea, the Coordinator may call upon several sources, depending upon the subject matter and where the needed expertise can be obtained.

Several possible activities have been identified to date and will require further study. They include: 1) Farm pond fish production for which MIDA's Directorate General of Aquaculture could provide assistance in construction and management, as well as stock them from MIDA's existing hatcheries. 2) Portable kilns to demonstrate commercial scale manufacture of charcoal (for local consumption) utilizing wood scraps and other waste materials. 3) A portable sawmill for a small-scale lumber industry.

D. Assumptions

The one major assumption, critical above all others to project success, is that integrated rural development will continue to be a priority in GOP planning and that this priority will be reflected in the future budget allocations to key institutions, e.g., PRODIAR, and its future impact area projects. (Other assumptions can be found in the Logical Framework, Annex I D.)

E. Complementary Inputs

1. AID

As specified by AID/Washington in its approval of the Intensive Review Request (IRR), activities funded under existing loan projects that had not been firmly programmed will be implemented in Tonosí as part of the coordinated development effort. The principal AID-financed activity in this respect is in the health sector for which a minimum program for Tonosí has already been agreed with the Ministry of Health under Loan 045. Since an MOH Health Center already exists in the district seat and is currently under-utilized, health activities will be confined to the construction of four aqueducts, eight deep wells and 720 latrines, and an expansion of the vaccination program. The water supply and latrine construction program will be implemented and phased in accordance with general spatial planning and in coordination with the housing program.

Investments in housing, to the extent required and in conformity with overall spatial planning, will be provided by the Ministry of Housing, either from

the existing AID loan (039) or from Government resources, as already specifically agreed.

At least 300 housing units will be built during the early years of the project. Priority will be given to low-income participants involved in the resettlement plan and additional provisions for housing will be made as the magnitude of these shifts becomes more firmly established in future years.

Financing of rural housing will follow the established practices, consisting of community contribution of local materials and unskilled labor (land will be provided as part of the overall land redistribution scheme), and Ministry of Housing (MIVI) contributions for land leveling, subdivision, plans and technical direction, purchased materials and skilled labor.

## 2. Other Donors

The IDB-funded access roads project - implemented by MOP - is making a material contribution in two asphalt road sections. One should be completed during the 1978 dry season and the other is due for completion in 1979. The former, an extension of the Tonosí-Cañas road to Pedaquí, will provide access to the markets in Pedaquí and Las Tablas. The latter is a 25 km. asphalt road southwest from Tonosí to the coastal village of Cambutal and will be very important for the development of the high-potential Guanico valley which has no all-weather road at present.

A Basic Cycle Production School already exists in the district and is being expanded under the existing IDB education sector loan. Distribution of conventional elementary schools appears to be satisfactory. Thus, no additional investments in Tonosí are contemplated under AID's education sector loan (043).

PART IV. PROJECT ANALYSIS

A. Technical Analysis

Agriculture, Forestry and Environment

The design of all project components is based on the application of technologies appropriate to the human, economic and natural environment of Panama, and in particular of the district of Tonosí. This means that (1) as explained in Section III and in Annex V (Social Soundness Analysis), mechanical technology in construction, produce handling and farming will be employed in operations where it is clearly required for climatic, agronomic or economic (relative opportunity costs) reasons, or combinations of these; (2) farm and forest technology, while based largely on available research data and field experience under local or similar conditions, is designed for relatively short-term absorption by the target population, and (3) land use planning and the overall product mix are explicitly based on known or assumed natural and human capabilities in the project area (as well as on market considerations).

1. Farm level technology

This analysis consists of two parts:

- (a) appropriateness of land use and production patterns;
- (b) reasonableness of targets for crop and livestock yields.

(a) Appropriateness of Land Use and Production Patterns

General land use planning follows the land capability mapping of the 1967 cadastral survey, as explained in Part II.

The Tonosí district comprises approximately 15,000 hectares - or 11 percent of its total land area - of very good land suitable for annual crops. Of this, 10,000 has. are classified as Ca land without danger of flooding and 5,000 has. are classified as Ca-U land, subject to brief seasonal floods about one year in three and lasting only a few days at a time. These lands also include about 1,500 has. of excellent, loose-textured and well-

drained land suitable for very intensive cropping able to produce high yields of a wide range of crops adapted to the humid tropics; much of this coincides with the approximately 2,000 hectares of river banks deemed to be irrigatable at moderate cost. Given this very good productive soil capability under the project only about five hectares in crops are required to provide the minimum target family income, depending on specific land quality and on whether the farm includes some irrigation. Erosion is not a problem since practically all of this potential cropland has a slope of less than 3%.

Another 32,000 has. of sloping land, most of it with slopes of 20-45%, is better suited to pastures (Cp) and is being programmed for the semi-intensive dairy/beef production units. These lands will respond to pasture improvement and more intensive management so that 20-25 has. will provide the target family income.

The fact that the United Fruit Company had acquired 36,000 hectares (i.e., the equivalent of three-fourths of the Ca and Cp lands) in the district in the 1920's indicates the relatively high productive potential of much of this land. The various expert surveys made for this company over the years up to the 1940's agree on the area's great potential, limited for bananas only by frequently high winds and the need for substantial irrigation investment.

The remaining lands within the district are divided into three basic categories, i.e., lands suitable for limited grazing under rigid conservation practices to provide watershed protection (N lands totalling 24,000 has.); lands suitable for commercial reforestation (RF lands totalling 21,000 has.); and forest lands suitable for some degree of commercial exploitation (F lands totalling 42,000 has.). Given the poor soil capability these three categories of land will not play a direct role in increasing agricultural production. However, since these 87,000 has. are over-utilized, thus causing excessive runoff, erosion, and deterioration of the soil and vegetation, the forestry and watershed protection phase of this project will play a vital role in correcting these serious problems with the establishment of grass on N and RF lands and timber on F lands.

In sum, commercial crop production will be practiced on level alluvial land. The more gently sloping piedmont area and the flood-prone lowlands will be devoted to cattle grazing, and the erodible or eroded steep slopes will be left in forest or reforested and protected against further degradation. This land use planning is technically and economically sound. Furthermore,

it is deemed to be feasible over the life of the project because it will involve only about one-third of the district's potential crop and grazing land, and reforestation about 10 percent of the degraded hillsides. Nevertheless, the land use shifts to be implemented by the project are designed to lay the foundation for longer-run follow-up in the same district including lands not subject to redistribution. It is theoretically possible to suggest a far more productive crop mix - and crop/livestock mix - than is presently contemplated for the project's five-year life; on-farm labor utilization is projected to not exceed 55% of theoretical availability on an annual basis by year 5 while machinery input will be relatively high; the acreage in legumes is small and soil-building rotations are not being contemplated -- not to speak of green manuring, etc. But, in view of the analyses of Panamanian and local circumstances presented in the Sector Assessment and in Part II and Annex V of this paper, it is felt that the suggestion of greater technological sophistication in cropping patterns (as well as in specific crop and livestock handling technologies and overall farm management) at the outset would tend to delay the desired impact on participant incomes and would thus lead to participant and official frustration and disillusionment with project results. A judgment has thus been made to attempt to introduce more "exotic" technology gradually, perhaps even during the life of the project, but to not make the feasibility or viability of the project depend on it.

Indeed, a large part of the project expenditure for research is meant to be channeled into testing new lines of production at the farm level. This will be done through innovative individuals or groups. Moreover, the limitations built into preliminary production planning are not meant to imply that innovators will be excluded from trying new lines. Indeed, the credit program will provide maximum flexibility in this respect. And the "innovation insurance" provision is meant to overcome risk-taking aversion not only among producers but also of the BDA.

The full impact of these experiments and trials will, of course, not be felt until the second five-year development stage. Quantitative projections in this sense at this time would be pure speculation.

#### i. Crops

According to census data, approximately 35 crops are grown in the area at present, though the majority only for subsistence. Considering temperature, rainfall, topography, soils

and length of growing seasons (see Chart IV A-1), an even greater variety of crops can be grown. However, linear programming analysis indicates that, for commercial farming purposes, 13 crops were most promising; corn, sorghum, cassava, yams, tobacco, tomato, onions, sweet pepper, melons, sugar cane, plantain, cowpeas and pigeon peas.

The final selection for project planning purposes was made on the basis of realistic assessments of short-term (5 year) considerations of assured markets and technical capability, with the primary objective of providing a secure family income while utilizing operator's and family labor as fully as climatic factors, technical requirements and relative factor costs allow. Melons, peppers, pigeon peas and tobacco were eliminated from the basic list for planning purposes; the three former because of market uncertainties, and the first two also because of uncertainties regarding the actual irrigable acreage available for project participants. Tobacco was deemed to be more suitable for future development under private auspices. The final choice, as reflected in Annex II E, Table 2, thus represents what is considered to be the most realistic crop mix for the initial development period covered by the project.

Rice has been shown in recent years to be a very profitable and ecologically well adapted crop on the lower alluvial soils in the project area. Fifteen commercial operators grew 1030 hectares of rice in 1976/77. Together with sugar cane (and perhaps even more than sugar cane), rice is the basic crop for which the best technological packages exist in Panama. Indeed, it is this assurance of minimum yields, in addition to the effective support prices, that make rice so attractive even for joint production schemes of small farmers, despite the high degree of mechanization included in the technology.

Corn (maize) is a traditional crop in the area, though mostly for subsistence and local sale. It is especially adapted to the better-drained and lighter soils. Adequate technological packages (including high-yielding open-pollinated seed) is already available, although their commercial application is lagging. (A corn/sorghum specialist has been advising the Faculty of Agronomy for more than one year under a grant-funded T/A project, and both, the Faculty and IDIAP, have been receiving valuable technical assistance and training from CIMMYT). Corn is the second most important crop of the land reform asentamientos (after rice). Somewhat less mechanization will be employed for corn than for rice or sorghum.



Sorghum is planned as a second crop for planting after the rice harvest. (See Chart IV-A-1). Sorghum is presently not grown in the area, and is still in its infancy in Panama. Nevertheless, soil and moisture conditions in Tonosí indicate that the crop can be grown successfully and with a minimum additional fertilization during the dry season (when it does not compete with corn) for harvest in February and March. Intensive field trials may be required to select the locally most suitable varieties in terms of yields, growing cycles, etc. from the seed presently being developed in Panama.

Cowpeas (vigna sinensis - the Panamanian staple dry legume for food) appears to do very well in this area as a dry-season crop, even with traditional technology and on marginal land. Projection of a rather modest acreage for this crop therefore is a function of assumed demand - rather than technological - constraints. However, if commercial cowpea productivity turns out to be exceptionally high, project participants may be able to undersell the support price and, if demand is sufficiently price-elastic a substantial expansion of cowpea acreage could be contemplated. Introduction of other soil-fertility building legumes will have to await local trials of soybeans (another AID-supported Faculty of Agronomy activity) and of forage plants such as kudzu and crotonaria.

Cassava and yams grow well in the area on many types of soils and their commercial-level productivity can be enhanced through simple and labor-intensive technological improvements. The moderate acreages projected reflect uncertainties regarding demand even though there are not expected to be any marketing problems in the short run. Time will tell whether aggressive marketing for domestic and export sales will allow expanding the area of these crops, which are much more profitable per unit of land than the "basic grains".

Sugar cane is also traditionally grown for subsistence and cattle feed, and it is the latter use that appears most promising for project participants, under moderate and labor-intensive technological improvements. There may also be a market for evaporated cane liquid produced by the more than 100 traditional trapiches in the district.

In view of uncertainties regarding the practical possibilities for including a substantial proportion of the readily irrigable river banks (estimated at 2,000 has.) in the land transfer to participants, total irrigated acreage has been projected at a conservative 400 has. at year 5. One-half of this is projected to

be in plantains, another traditional crop that has a good short-run market outlook. Tomatoes and onions - the other two irrigated crops with assured markets - are being successfully grown by small producers in other areas of Azuero, and tomatoes are already being produced on a small scale in Tonosí. Acreages of both will be circumscribed by marketing agreements and processing contracts, respectively (see 3 below).

## ii. Livestock

Owing to doubts about the profitability of small-scale commercial pig and poultry raising at present prices of conventional feed, presently programmed livestock producing activities in the project are limited to cattle. Nevertheless, to the extent that the utilization of low-cost agricultural waste or by-products indicates economic viability, or if and when conventional feed prices decline, producers might be encouraged to go into pig and/or poultry raising during implementation.

Cattle raising for beef has been the traditional mainstay of the area's commercial activity, but mostly along the extensive, traditional pattern despite the fact that Tonosí's pasture land includes the bulk of the flat alluvial land of Ca and Ca-U quality that has a much greater economic potential for crops. The less productive pastures are on the higher lands, including those where no grazing should be permitted, or where grazing should be strictly controlled. Tonosí owes its reputation as a lush cattle ranching area, where pasture and cattle conditions appear very good even towards the end of the dry season (including such droughty years as 1977), largely to the land tenure pattern and the associated lack of campesino access to technology and credit, that have prevented more intensive use of the Ca lands. <sup>1/</sup> The practice of "ceba", i.e., buying weaned calves from breeding and dairy ranches for grazing or green fodder feeding to slaughter weight, will be typically limited to the flood-prone lowlands (ca-U class) where high-yielding and water-logging resistant forage species may be introduced.

As discussed in Part III, financial and economic viability (including employment considerations) of beef breeding and fattening enterprises for project participants is doubtful pending further investigation. If these activities are in fact included in operational plans, the cattle breeding operations will be located on the lowest capability grazing lands, whose carrying capacity will be designed solely for breeding cows and replacement heifers; calves will be sold to the other two types of

<sup>1/</sup> The bulk of this land is in comparatively low-value faragua grass, and little if any fertilization is used.

units or to non-participant operations at weaning time.

A number of years ago, ranchers of various sizes began to milk their cows once a day and to convert the milk to cheese or sell it to the country's two main processors. Milk-breed bulls (both Brown Swiss and Holstein) were brought in to up-breed the cebu herds, and the crosses have shown good adaptability. Productivity per hectare and per cow remain low because the pastures and the "dairy" herds continue to be managed largely with a mentality shaped by the extensive beef tradition. Yet milking has apparently resulted in higher incomes, and has certainly improved cash flow as payments are received every two weeks rather than once a year. With milk sales of over 2.5 million liters in 1976 in the district, in addition to beef on the hoof, this combination represents a viable basis for project implementation at minimum target income level, as family or joint units, with a minimum of 20 hectares of good quality Cp land per family.

b. Reasonableness of targets for crop and livestock yields

Yield targets have been conservatively projected and phased taking account of Panamanian field experience under conditions of high-level and sustained inputs of technical assistance and credit; the assumed absorptive capacity of the project participants, and, finally, the capability of the land in question.

i. Crops

Rice yields (rough rice basis) of 2.7 mt/ha. for the first year and 3.0 mt/ha at end of the project are acceptable; they compare with a nationwide average of 2.4 mt/ha on 15,000 hectares of joint production schemes in the good crop year 1974/75, and a similar national average for all mechanized rice for 1975/76. The commercial growers in Tonosí averaged 3.2 MT per hectare in the droughty 1976/77 season, and the Junta Comunal of El Cacao produced a yield of 2.5 MT on 69 hectares.

Minimum yield of corn of 2.5 mt/ha in the first year under moderately improved technology is about one ton above the national average for mechanized corn in 1975/76. One commercial grower in Tonosí obtained a yield of 3.2 MT per hectare on seven hectares in 1976/77, and a number of small farmers in another zone of the district harvested an average of 2.3 MT on 40 hectares. The projected average yield of 2.7 mt in the final

year will require a moderate additional technological effort under Panamanian conditions.

Inasmuch as an entirely new technological package is involved, the yield projections for sorghum of 2.4 mt/ha the first year and 2.7 mt/ha the third year of project are acceptable. Sorghum yields in 1976/77 in the Rio Hato development project were 2.4 - 2.6 mt/ha with open-pollinated varieties, and 3.85 MT with hybrids.

Projected yields of cowpeas (1.2 mt/ha for year 1 and 1.4 mt/ha at year 5) are moderately higher than the 1970/71 Tonosí average, which was substantially above the national average. There is at present no commercial-scale production. The projected yield can be obtained with the proposed technology on good land as a second crop.

The projected average yield of cassava, at a uniform 16 mt/ha, is about 50 percent higher than the 1970 average for Los Santos province (on subsistence farms and marginal land), a level that should be attainable without difficulty in the project. Yam yields are also considered reasonable at 15 mt/ha.

Sugar cane is presently producing an average of about 60 mt in non-irrigated, commercial plantings in the Azuero region. A target yield of 50 mt/ha for the project thus appears easily attainable.

As regards irrigated crops, good yields of canning tomatoes in the main production areas of Azuero and Coclé have reached 23-25 mt/ha on many small farms. The progression from 22 tons to 24 tons from the first to the third year of plantings in Tonosí thus seems reasonable.

Onions have also been grown successfully by small farmers in nearby Coclé and Herrera provinces for a number of years. Yields of up to 18 mt/ha are now common in those areas, while the project very conservatively expects to average about 14 tons in year 1, and 15 tons in year 5. The latter target may well be exceeded substantially in practice. Plantain yields at full maturity-projected at 16 mt/ha compare with an average of 12 mt/ha on 81 hectares in the district according to the 1971 census.

Experience in many areas of the world has shown that among traditional peasants yield-increasing technology takes hold more rapidly when entirely new production patterns are

introduced. In Panama the shift from primitive subsistence cropping on marginal lands to partly mechanized, commercial production on good cropland does in fact contain elements of radical change. Even though the small farmers concerned may have been growing the same crops with their traditional methods they are aware that with these methods it is not possible to produce an adequate marketable surplus even if more and better land were available. Besides, the modern technological package for rainfed crops is often applied almost directly by outside agents, such as the MIDA and BDA officials who design and implement the production and credit plans for group farming schemes, procure the inputs and machinery services and assure sales through IMA. Introduction of new technology for labor-intensive irrigated crops has depended more on individual initiative and participation. Devising a method for combining aggressive, rapid promotion of the new technology among crop farmers with maximum participation by the latter for lasting effect will be a formidable challenge for field personnel in the implementation of this project.

#### ii. Livestock

Design of the cattle development component of the project is based on awareness that traditions and habits in this line of production are likely to change at a much slower rate and much less spectacularly than in the case of crops, for both social and technical reasons. Thus, upbreeding of dairy herds - to second crosses - will be based on cebu or crossbred cows and male milk genes, through dairy breed bulls and/or semen, in line with what is already taking place. Pasture improvement will be gradual as will be the stocking rate of the grazing land; the target rates at full development for the three types of cattle enterprises on the different quality land allotted to each are felt to be reasonable even though pastures will be on Cp land. (The 1971 census average of 1.3 head per hectare is not a good guide because (a) the census was taken at the beginning of the rainy season, (b) the figure is a composite average of all grazing land in the district, ranging from NF to Ca class land and (c) it does not distinguish ages of cattle.) Saleable milk production targets per cow/day and per hectare/year of pasture, designed to rise from 3.5 and 300 liters, respectively, in year 1, to 6 and 1,100 liters in year 5, are conservative 1/ in view of the set of

1/ The average total milk production per milking cow in Los Santos province in one day in December, 1976, was 3.3 liters according to a recent nationwide survey.

technological and management improvements that must take place in order to achieve them. One of the most important of these is the introduction of forage conservation in the form of silage (climatic conditions seem to militate against hay making). This practice has so far been adopted by very few cattlemen in the hot lowlands despite the potential abundance of fodder that can be cut and saved during the rainy season (assuming the right fodder varieties are planted) and the recurring problem of maintaining cattle numbers on range (and their weight) in the dry season. Much of the project's success in this activity will depend on the introduction of the herd management changes that the greater year-round availability of fodder will make possible. Introduction of twice-a-day milking in the second phase of district development would make it possible to exceed project targets substantially. Its feasibility will also depend on establishment of farm-level cooling facilities or twice-a-day pickup. The project staff will study these possibilities and constraints during project implementation.

2. Watershed Protection, Forestry, and Soil Conservation

The watershed protection, forestry and soil conservation components of this project are essential to prevent further degradation and destruction of natural resources. The destructive process has short run as well as long run implications for protection of the valley against flooding and to increase stream flow during the dry season for human and livestock consumption and for irrigation. Moreover, the economic utilization of natural forests and the harvesting of plantations of marketable, adapted species on non-agricultural land will provide substantial future income for the rural population and will favorably affect the country's foreign trade balance.

Based on the work of two short-term consultants and on extensive discussions, the Mission is satisfied that the activities planned in this project component, and the manner in which they are designed to be implemented, are technically feasible.

Sufficient experience exists in Panama and in similar areas with the soil types and forest species concerned. Moreover more detailed soil and forest inventories will constitute the first phase of the reforestation activity. Also, the reforestation proposal is based largely on the limited experience already gained in Panama in the last few years. The forest product utilization proposals are experimental in nature and are designed to establish both technical and economic feasibility on a larger scale, in Tonosí and elsewhere.

Protection of upper watershed soils through natural revegetation is not considered to be feasible because the population cannot be expected to respect such vegetation; they are expected not only to respect, but to actively protect, tree plantations in which they participate and from which they can expect a future income stream.

Technical assistance will be sought in an effort to bring important recent research findings in tropical ecosystems to bear on the project, such as that regarding the importance of microrhizobial fungi in forest regeneration. Forest product utilization is also expected to benefit from recent applied research; one example is pyrolytic conversion for more efficient energy production.

For additional detail, see Annex IV.

3. Market Outlets, Potential and Facilities

Among the crops and livestock products commercial output of which is to be expanded or initiated in the area as a result of the project, only onions and rice require special attention by project investments. As explained below, market outlets and facilities for all other products are considered satisfactory under local conditions and for the volume of marketings projected for the life of the project. Nevertheless, local project implementation will be continuously monitoring market practices and structure for all products in order to be able to suggest corrective action at the appropriate level. And, as indicated in Part III, the creation of viable marketing cooperatives will be an important concern of project implementation once the groundwork for basic production organization has been completed.

a. Basic Grains

Panamanian rice production, on average, is expected to continue to equal domestic demand at the Government fixed price, and Tonosí has already been identified as an area where rice can be grown comparatively cheaply at a time when it has been decided to withhold official credit for this crop in less productive, though traditionally rice-growing areas. Panama will continue to be a net importer of feedgrains (corn and sorghum) for an indefinite period and price elasticity of demand is assumed to be high. The area also appears to have a natural advantage for cowpea production, demand for which is expected to rise with the price reductions announced in January 1977.

A new 150,000 cwt. (6,800 MT) combined bulk-bag feed grain storage facility of the Agricultural Marketing Institute (IMA) in Las Tablas is expected to be ready in 1978 (financed under AID Loan 042). Private millers, who are already absorbing more than 3,000 MT of rice produced in the district, are expected to purchase most of the project output (some of which, in fact, may come from land presently being grown with rice by large commercial operators). Nevertheless, as is the policy in other important rice growing areas, IMA will stand ready to purchase as much as 20% of the project's output for storage at its Las Tablas facility in order to support the price at any time this appears necessary. The project will provide a tempering bin and a drier for this facility. When that is in place, at least two of the six bulk grain bins (capacity, 16,000 cwt. each) will be reserved for storing IMA's rice purchases from the project.

By the time the first harvest is ready in the project (late 1979), IMA's recent problems with lack of cash for prompt payment are also expected to be overcome. However, as pointed out in Part III (under Credit), production loan borrowers who sell to IMA will not be required to repay their loans until they do receive payment from IMA, and no interest on the unpaid balance will accrue in the interim. This - together with the ample availability of official production credit - is designed to avoid sale of rice to private buyers at less than support levels. (The fact that project participants are to receive subsistence advances during the first three years should also reduce the need for immediate cash at harvest time.)

Private feed mills and the cooperative mill at nearby Chitré are expected to take all corn and sorghum produced by the project off the market without difficulty at the support price, as they are doing now in most areas of the country. IMA's Las Tablas facility would be able to handle easily any temporary surplus corn and sorghum, as well as of cowpeas. In case the market for the latter proved to be weak, land planned for this crop could be easily shifted to sorghum.

#### b. Semi-perishables

There are well-established, if somewhat informal, marketing channels for getting root crops (cassava and yams) and plantains from farm to city market. Their high prices to consumers indicate the existence of substantial additional demand. Some assistance from project personnel for organizing collection points and assuring timely availability of transport - activities that lend themselves ideally for simple cooperative action - may be required.

There also seem to be good possibilities for export, which will be studied carefully by IMA during initial implementation.

The three temporary storage chambers that will be constructed by the project as part of the machinery storage and maintenance facility will permit collection of bagged grains and semi-perishables at a central point with easy access for trucks of buyers. The total floor space will be 945 m<sup>2</sup>, with a height of 8 m, for a maximum theoretical capacity of about 7500 m<sup>3</sup>.

### c. Irrigated perishables

As explained in Part III, care has been taken to exclude from the production program some crops for which, though they may be highly suited to the area and very profitable, there are no assured markets at this time. Melons are a case in point. To the extent that such markets are developed during the life of the project, they can of course be incorporated into operational planning.

Plantains were discussed above. The other two crops currently contemplated are canning tomatoes and onions.

The demand for tomatoes has been constrained by the limited capacity of the processing plant of Compañía Panameña de Alimentos in Natá. Nevertheless, this plant, 173 kilometers away, purchased 786,000 pounds of industrial tomatoes from the Tonosí area in 1976. A considerable expansion of tomato production in Tonosí will be possible during the life of the project as the Compañía Panameña de Alimentos is constructing an additional vegetable processing plant in Las Tablas. This plant - to be operating by 1978 - will have a capacity of processing 340 MT of tomatoes per day with three shifts. The planned project output of 1500 tons can thus theoretically be processed in five days at the new plant. Planting and harvesting will be programmed in accordance with the factory's daily absorptive capacity. Existence of this plant will also make it possible for farmers in Tonosí to contract production of other vegetables.

Following the glut of canning tomatoes in 1975 and 1976 which resulted in traffic jams at harvest time and substantial factory stocks of tomato paste that could be exported only at a loss, a sliding scale of producer prices for tomatoes was set up: prices paid for deliveries beyond the contract date and quantity are now designed to allow profitable export of surplus paste. The contracts and price schedules are negotiated with grower cooperatives under the aegis of MIDA. The same system will be applied in the project

and a cooperative marketing organization will be created among the tomato growers.

Special provision needs to be made for the curing/drying and storage of onions to be produced by the project. Panama's efforts to reach self-sufficiency in this seasonal product have been hampered by the lack of suitable drying and storage facilities to hold enough of the domestic crop for release to the market during part of the rainy season, especially since the varieties presently being grown in Panama will not keep well without such special facilities under Panama's climatic conditions. 1/ Loan 042 is providing a curing/drying and storage plant at Aguadulce, in the middle of the traditional lowland onion area with a capacity of 680 MT. However, this facility, planned and designed before the Tonosí project was developed, will be able to handle only nearby production. The project will therefore provide two additional units for the Aguadulce facility which will cure/dry and store on a priority basis up to 1360 MT of onions - 90% of projected output for 1981/82 from the project area. However, only one unit is programmed for the 1979 crop year. At that time a determination will be made regarding the need for the second unit. As customary, IMA will be the buyer at the announced support price (13.5 cents per pound in 1977).

#### d. Milk

The only acute market constraint for the present or projected milk output of the district is the lack of all-weather access roads, particularly into the southwestern corner of the Tonosí valley and the Guánico valley to allow milk to be transported out of the area during the rainy season which is the time of greatest potential milk production. In 1976 Compañía Panameña de Alimentos (the Nestlé subsidiary that operates Panama's largest milk condensing plant) bought 755,000 liters of milk in Tonosí for its Natá plant. The country's largest dairy firm, Estrella Azul - which also produces evaporated milk - purchased 1,758,000 liters from 266 producers. The total - 2.5 million liters - is equivalent to three-fourths of reported 1970 milk production in the area.

1/ IMA, MIDA and IDIAP are testing new varieties with a view to reducing the need for special handling in the longer run.

Panama will continue to be for the foreseeable future a heavy importer of milk and milk products. <sup>1/</sup> Compañía Panameña de Alimentos has indicated that they stand ready to purchase any additional milk output from the Tonosí area. Estrella's receiving station is at La Arena (108 km.). Transportation to both plants costs about 10% of the producer price.

A small, municipally managed, fresh cheese plant began operating in September 1976; it has manufactured up to 200 pounds of fresh cheese per day which is marketed in Panama City. At this rate it could be buying about 80,000 liters of milk per year although it has capacity for about five times this amount. It has no pasteurizing facility: the cheese is made from raw milk. The project area staff will study, jointly with the municipio and the Ministry of Commerce and Industry, the feasibility of providing the plant with adequate operating seed capital, and of installing a pasteurizer (at an estimated cost of \$25,000) with financing from the Municipal Development Fund (FODEM).

The GOP-fixed producer price for industrial grade milk is presently 16.5¢ per liter. No attempt will be made during the life of the project to upgrade milk from participants' herds from grade B to grade A, but measures will be introduced to assure better quality and sanitation of the grade B milk delivered to the wholesale buyers and to the municipal cheese plant.

An adequate market will also exist for the male calves that will be produced by the dairy ranches. These will be reared on the farm through weaning, to be sold at an average (1977) price of about \$90. Purchasers will be nearby beef cattle ranchers who will put the steers on pasture until they reach slaughter weight. If the combination of joint crop production units with joint cattle fattening enterprises in the wet lowlands proves feasible (see <sup>1</sup> above), these will represent a guaranteed market for at least part of the male calves and the added value will accrue to the project. No surplus of female calves or heifers is contemplated during the life of the project, as participants will be building up their herds. Beyond this, there is expected to be a good market in the rest of the country for crossbred calves or heifers from herds with proven milk producing capability.

e. Beef

Beef cattle breeding enterprises are specifically excluded from project planning until further notice, in large measure because of market (i.e., price-cost) considerations. Beef prices for domestic consumption have been controlled at levels that

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<sup>1/</sup> See Section B below.

were until recently below world market prices, and exports represent a very small proportion of total slaughter. Even so, in the last few years the country's cattle herd had expanded to a point where combined effective domestic and foreign demand at times were barely able to absorb the available supply. The recent doubling of the voluntary export quota to the U.S., and an agreement for the export of 25,000 heifers to Venezuela in 1977, coupled with the presumable reduction in the breeding herds as a result of the 1976-77 drought, are likely to avoid any short run surplus problem. Moreover, in the longer run it is expected that both the domestic and export markets will expand and perhaps prices will become more attractive.

A newly completed modern slaughterhouse in Las Tablas will, inter alia, lower transportation costs for live cattle to the benefit of Tonosí producers.

f. Transportation

The road improvement to be undertaken by the project will remove the major bottleneck for larger marketings of produce in the area. No special provisions for transport equipment were made in the project because the private sector in the nearby towns was found to have adequate capacity and competition to serve the project's needs. To the extent that any deficiencies in this respect are found during project implementation, private bank credit and official cooperative credit will be used to make it possible for project participants as individuals or groups to acquire vehicles. The dump trucks belonging to the Municipio could also be rented when not needed for road maintenance.

4. Reasonableness of Project Costs

The reasonableness of the cost of the agricultural component of the project can be judged by reviewing the individual elements. The major element, the credit requirement, was established by setting up several typical production models and estimating the credit requirements assuming a level of technology and production costs to reach an output level designed to yield the target net income. This was then compared to the general existing credit experience of the BDA for the crops and acreage involved. Since the total number of participating families is known, a judgment as to the rate of participation for target group members according to expected activity was then made and the total amount of credit requirements established. As pointed out above,

the yield estimates are considered reasonable for Panama and there has been sufficient AID experience in agricultural production programs in Panama to permit a judgment that the requirements are reasonable.

The machinery requirements reflect basically the requirements for commercial rice production with the technology presently in use in Panama on commercially oriented private farms and group farming enterprises of land reform settlers and juntas comunales. The requirements have been carefully studied to assure adequate seasonal availability of power and implements for operations in rice growing and mechanized operations for other field crops such as corn, sorghum and cassava within the limits of maximum annual usage feasible for each type of machine.

The forestry costs are based on actual though limited Panamanian experience. This experience indicates that the cost of reforestation per hectare declines as experience is gained in each new area. Any savings in such unit costs during implementation will be reflected in commensurate expansion of the area that will be reforested.

Estimates of the cost of rice drying and onion drying and storage facilities are based on preliminary A&E work for similar or identical equipment under loan 042.

#### 5. Environment

As explained in Annex VII, not only will the Project have no negative effects on the natural and human environment, but it is designed for a maximum feasible positive impact on both. This impact will be produced by (a) the watershed protection and reforestation component, (b) the resettlement of slash-and-burn subsistence farmers from degraded or degradable lands to ecologically and economically suitable crop and grazing land, and (c) the creation of stable, culturally adapted self-employment and income earning opportunities for all of the rural poor in the district.

B. Economic and Financial Analysis <sup>1/</sup>

1. Economic Analysis

a. Summary Economic Results

This project is expected to increase the value of marketable agricultural output of project participants from roughly \$0.7 million in 1976 to \$4.5 million annually when the program is fully operational, and to nearly triple the annual per capita income of the 1,000 target families - from an estimated \$140 to about \$400. <sup>2/</sup> The project is expected to yield an overall internal rate of return of 18 percent.

b. Economic Benefits at the National Level

Agricultural productivity in Panama remains substantially below the productivity of the other sectors. The value of agricultural output per worker in Panama in 1975 was approximately \$2220, compared to \$5140 for the rest of the economy. The rural poor - approximately 50,000 households comprising one-third of Panamá's rural households <sup>3/</sup> - is the least productive segment in Panamanian society. They not only fail to contribute significantly to the general economy; they in effect constitute a burdensome drain as recipients of subsidies and social services financed largely by the other sectors.

Low agricultural productivity means that export possibilities as well as output and domestic consumption of local agricultural products are limited and, at the same time, agricultural imports are stimulated in view of Panama's relatively open economy. About two-thirds of the value (about \$40 million in 1975) of imported agricultural products is producible in Panama, and such a substitution would add about 15% to agricultural GDP. <sup>4/</sup> There is also a substantial potential export market for "traditional" and new agricultural products in the present Canal Zone and abroad.

<sup>1/</sup> For details, see Annex II.

<sup>2/</sup> The national average in 1976 was about \$1,180, but the average outside the metropolitan area is about one-third lower (see Annex II A-5).

<sup>3/</sup> See Agricultural Sector Assessment, Part VI C.

<sup>4/</sup> Ibid., page 37.

By attacking the twin problem of rural poverty and low farm productivity through an integrated development effort at the regional level that involves the rural poor as priority participants, the Government of Panama is extending its policy of promoting economic growth with equity, thus matching the principal concern of AID's "New Directions". The 10,000 households expected to be involved directly in the six local impact areas contemplated for implementation during the next few years comprise 20% of the rural poor. The combined impact of these projects on the national economy should thus be substantial. In addition, problem solving through innovative approaches at the local level is expected to point the way for wider application of the tested solutions, thus supplying fallout benefits for the national economy (that cannot, however, be quantitatively forecast at this time.)

The \$4 million annual increase in agricultural output targeted for Tonosi represents about 2.2% of 1976 agricultural GDP at current prices. The additional onion production, combined with the new storage facilities to be financed by the project will make Panama virtually independent of seasonal onion imports (\$800 thousand in 1976). Increased milk production will save an additional \$1,250,000 in annual imports of dried milk (out of annual imports of milk and milk products of \$8 million). Exports of tomato paste at competitive prices will bring in new foreign exchange. The new corn and sorghum production will materially reduce the import gap for feedgrains. And shifting rice production from less productive areas to Tonosi will contribute to lowering average cost of production and thus eventually to the possibility of reducing the support price to nearer the world price level. Larger output of other crops (cassava, yams, plantains) will result in lowering consumer prices and/or permit initiating exports to the U.S. market.

Quantitative projection of the multiplier effect of increased rural income in the project area and in nearby urban centers cannot be made at this time (but attempts will be made to measure it in final evaluation). It is certain, however, that the larger demand for basic services will create a number of new agriculture and non-agriculture related employment opportunities for the people of Tonosi and of nearby districts who might otherwise migrate to the metropolitan area. Indeed, the economic benefit to the nation represented by the difference between the cost of providing basic services in situ and providing them in the cities, for all those who will not be migrating to the city because of the project, should also be factored into the equation, although its quantification is not possible at this time.

c. Economic Benefits at the Farm Level

Annual family incomes of the project participants are projected to increase from an estimated \$700 in 1976 to approximately \$2,000 (\$140 to \$400 per capita) when the project is fully implemented. This large expected payoff, plus other benefits (resettlement on good land, technical assistance, new farm-to-market roads and credit—including a labor advance during the first years after resettlement) assures participation and a maximum effort from most of the 1,000 target families.

Four different small farm models (rainfed cropping, partly irrigated cropping, mixed crop/dairy and dairy/beef) have been developed to demonstrate the project's attractiveness to the small farmer/rancher, although in actual practice the crop mix will vary according to soil characteristics and availability of water for the individual farm units. In addition, a significant number of mixed cropping/cattle raising operations - at least as joint farming enterprises - are expected in certain areas where Ca and Cp soils are intermixed. At the very conservative yield targets set up projected fifth year family incomes (including off-farm wages earned from labor on large ranches during slack agricultural periods), are \$2000 for rainfed cropping and partly irrigated cropping, and \$1850 for dairy/beef--an average of roughly \$2000 per family. The economic analysis of farm models demonstrates a return on investment of between 15 and 50 percent.

d. Roads and Area Analysis

The project has been broken down into sub-project areas on the basis of proposed groupings of roads and road segments, and preliminary internal rates of return (IRR's) calculated for each sub-project area. The purpose is to help rationalize the final selection of roads under the project. The sub-project areas are merely areas of influence of one or more road segments which have a high degree of homogeneity of soil, water, and topographic characteristics. Preliminary IRR's for each of the areas, which incorporate benefits to both project participants and non-participants, range from 12% to 30%, for an average of 18 percent.

e. Overall Return

The internal rate of return of 18 percent for the overall project is based on analyses which include road and administrative costs, as well as direct farm costs. Participants' benefits are measured by the increase in net farm income resulting from

project activities <sup>1/</sup>. The result was subjected to a sensitivity analysis with the following results: exclusion of non-participant benefits reduces the IRR to 14 percent; increasing estimated project costs by 20 percent reduces the IRR to 15 percent; reducing the number of participants by 50 percent, without lowering project costs, reduces the IRR to 12 percent.

f. Other Economic Benefits

The reforestation component of the project has been subjected to a separate economic analysis since it is a discrete income producing activity. The internal rate of return for the reforestation component is 20%. (See Annex IV)

In addition, the project will contribute to increased on-farm incomes of non-participant families through greater access to markets, especially for milk, and through transport cost savings for both crops and cattle. Data from milk processing plants show that milk sales from Tonosi decline at the onset of the rainy season owing to impassable roads. The decline occurs just at the time when milk output rises markedly in other areas because of optimum pasture conditions. Estimates of the probable increase in volume of milk sales resulting from road improvement range from 15 to 30% of current annual sales, or between \$75,000 and \$150,000. Reduction of weight loss suffered by cattle owing to existence of all-weather roads represents an additional benefit in view of the number of cattle in the district.

2. Implications for Government Finances

a. Prospects of Loan Repayment

The total debt service for Panama's funded public debt was approximately \$150 million in 1976, including that of semi-autonomous government agencies and enterprises. It is expected to increase steadily, assuming that the GOP is able to implement its development program at a pace reasonably close to its

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<sup>1/</sup> In addition, an estimated 25 percent increase in net income from non-participant agricultural activities as a result of project activities, especially road construction, is included as a project benefit.

Five Year Plan projection. This rising debt service burden causes concern, even though it does not involve a foreign exchange problem since the U.S. dollar is the Panamanian currency. The servicing of the direct debt of the Central Government alone absorbs 32% of Central Government revenues.

The heart of the problem is the large amount of expensive short and medium term foreign commercial debt which the GOP incurred over the past 2-3 years for its contracyclical public sector investment program. The GOP anticipated what it considered to be an unavoidable debt service problem, and a resultant need to restructure its debt by lengthening the maturity schedule of these commercial credits. It addresses the issue in its Five Year Plan.

The degree of burden depends, of course, on future revenue generation and cost savings as well as on the size of payment. Gradual resumption of economic growth and the GOP's recently expanded tax base should enhance revenues and a Canal Treaty settlement could provide substantial financial benefits to the GOP. Furthermore, many public sector projects, both underway and planned, which add heavily to debt servicing requirements, are designed to be self-liquidating and to greatly strengthen Panama's balance of payments. According to the Five Year Plan, the increase in annual foreign exchange earnings from Plan projects should reach \$245 million by 1982, a major accomplishment even in the event of likely slippage in the target date.

Although both debt restructuring and increases in revenue and exchange earnings will take time, the GOP must continue to borrow to carry out its public investment program, particularly as long as private investment continues to lag. The GOP recognizes fully the critical importance of maintaining a good international credit standing. It has never defaulted on a foreign debt obligation. In view of its longer run economic development and revenue generating potential, its recurring credit needs, and its policy of retaining its essential character as an open economy with growing attraction as a service-center for international commerce and finance, Panama is not likely to blemish this outstanding repayment record despite the difficult debt management problems it faces. We foresee no difficulties in the repayment of this loan.

The loan terms are discussed in the summary recommendations of this paper. For a \$9.7 million loan, 1/ the

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1/ A 20-year loan with a seven-year grace period for principal and first seven years of interest at 2% and 3% thereafter.

average annual debt service charges (interest plus amortization) to be repaid over 13 years (after expiration of the 7 year grace period) will be approximately \$903,000.

b. Replicability

One of the major concerns in developing this project has been the implication for the government budget and human resources of replicating similar projects in other areas of the country. In the long run the budgetary implications to the GOP should be negligible. The concentration of resources in a specific project area represents a rationalization of inputs into rural area development which will result, if not in actual monetary saving, at least in far greater cost-effectiveness of fiscal resources earmarked for improving the living conditions of the rural poor. The GOP is continuing to increase budget allocations for the rural areas. However (as discussed in Part I), the effectiveness of these resources has been limited by lack of budgetary and institutional coordination and local concentration. By combining the integrated rural development projects with the other development projects directed toward the improved social and economic linkages between provincial towns and the rural poor (such as Municipal Development Fund and the upcoming URBE Loan) the Government can demonstrate, through area-specific concentration, the benefits of such coordinated and concerted efforts. The end result will be the more rapid improvement in living conditions at significantly reduced per capita cost. The integrated rural development projects in the short term will almost certainly require the input of additional public resources beyond those that would be budgeted without the projects. It may not be politically or institutionally reasonable to expect a full offsetting reduction in inputs in other activities. Thus, the rapidity with which the GOP can proceed with these integrated projects will depend largely on the expected growth of GOP financial resources. The recently expanded tax base, coupled with gradual economic recovery, should generate steadily rising revenues (up 20% in 1977); the flow of both domestic and foreign credit to the GOP is expected to continue and a new Canal Treaty may provide significant financial benefits. Some combination of these factors should produce sufficient additional resources to permit the GOP to begin implementation of a few additional projects by at least 1980.

As indicated above, the present economic malaise is expected to improve as soon as a new Canal Treaty is ratified. If this occurs in 1977 or early 1978, it is believed that the Government will be in a position to implement additional projects. Some economies can be effected in these because of lower incremental credit needs as repayments from Tonosi accrue to the revolving fund.

It is conservatively estimated that \$2 - \$2.5 million will be available from reflows in time to contribute to the next project.

The projected GOP contribution to implementation of the Tonosi project is about \$7.7 million, equivalent to about \$7,700 per participant family. Tonosi represents in part a training ground for GOP staff. The relative density of such staff in new project areas is likely to be lower. With the possible exception of FY78 funded IRD loans, projected AID loans for rural roads and watershed management will finance any necessary inputs for those components. Additional marketing facilities may not be needed (except perhaps very specialized ones) since by that time IMA ought to have constructed sufficient facilities under Loan 042 to handle standard crops.

Given the GOP's emphasis on IRD and their ability to absorb the current per participant cost in this project during its current economic crisis the reduced GOP cost (estimated to be \$5,000 per participant family for future IRD projects, assuming continued external concessional lending ) should be well within GOP budget constraints during future years when the economic situation will have improved.

### 3. Financial Analysis

As is customary in social development projects such as this, the above overall economic and cost benefit analysis represents the principal justification for financial soundness. This section will cover the basis for the development of the project budget, the allocation of costs between the GOP and AID, and a detailed financial review of certain sub-activities of the project. These activities do not need to be justified financially in and of themselves. As integral parts of the project, their justification is based on their essential contribution toward achievement of project goals. The purpose of the analysis is to determine their individual financial viability to assure that, if subsidies were necessary, they would be adequately provided for in the project budget.

#### a. Budget and Cost Analysis

Project costs for the Integrated Rural Development Administration segment of the project total \$1,372,000 for AID and \$2,154,000 for the GOP. These costs include the headquarters staffs of MIDA and PRODIAR, development of information systems and surveys of new IRD areas, and the cost of technical assistance and training. With the exception of a minimal \$26,000 for vehicles and equipment,

the cost of central staffs, including personnel costs and operating expenses, will be born by the GOP.

The cost of developing information systems and surveys for new areas has been funded under this loan as an appropriate alternative to funding it through technical support grants as heretofore. Included are equipment cost for the development of an orthophotographic mapping capability in the GOP's Geographic Institute. While the cost of the equipment represents a sizeable investment, it is less than the additional cost of contracting such work abroad or undertaking the additional ground control required by conventional systems for the next five IRD areas alone, not to speak of the shortage of personnel and the time factor for massive ground control work. Purchase of the equipment and the cost of planned surveys total only \$715,000. This investment will substantially improve the GOP's capability for planning and implementing further IRD development projects as well as projected watershed and road projects.

Technical assistance requirements for both the headquarters and field operations are given in detail in Table 3 below. Long term external assistance has been budgeted at \$4,500/month and short term at \$5,000/month. The rates are considered reasonable especially in view of probable cost inflation during the life of the project; they are based on the Mission's current experience in contracting both U.S. and Third Country nationals. Contracting for Host Country technical assistance has been budgeted at \$1,500/month.

The budget for the Tonosí area has been developed in close association with the PRODIAR staff, for both AID and GOP contributions. Additional technical guidance for projected costs was obtained from the Ministry of Public Works for the Roads element, MIDA for agricultural and watershed inputs, IMA regarding marketing facilities, the BDA for credit requirements, and a USDA consultant for farm machinery costs and requirements.

The administrative expenses, funded by the GOP, represent the costs of the total staffing of the coordinator's office, technical staff and supporting staff. Requirements have been calculated on a phased implementation basis. Personnel costs are the major element (\$1,393,000) with operating costs at approximately \$100,000. AID contribution to this element is limited to small purchase of office equipment and supplies and residential furnishings (\$37,000), ten field vehicles (\$100,000) and construction of office and dormitory facilities (\$90,000).

Costs of surveys, studies and evaluations cover refining and updating of cadastral and census information and several specialized studies and evaluations to be undertaken throughout the life of project.

Road improvement is discussed in detail in Annex III and contains drawings and specifications that were negotiated with MOP and PRODIAR. These costs and standards were developed to arrive at a minimum upgrading of the road segments selected in order to accomplish the purpose of establishing a minimum all-weather road network.

Agricultural Development activities will be funded approximately 50/50 by AID (\$4,924 million) and the GOP (\$4,862 million). Land redistribution and resettlement costs are being funded by the GOP (\$2.5 million) and consist of the estimated costs of the compensation for improvements on the land to be acquired for the resettlement of project participants, as estimated by MIDA's Agrarian Reform department. Major farm equipment to be purchased will be operated by the area project team as an equipment pool to be rented to participating farmers with credit financing provided under the project. Calculations of machinery requirements and projected cash flow of the machinery pool (Annex II) demonstrate its self-sustaining financial viability at current rental rates. The GOP will furnish initial working capital requirement of \$100,000.

The market analysis (Section A above) discusses the rice drying and onion storage facilities which will be needed in order to assure the marketability of the increased production expected to be generated by the project. The GOP will provide an estimated \$750,000 as initial working capital for the operation of these facilities. A&E estimate of the cost to construct a similar facility for onion drying under AID Loan 042 is \$450,000. Because it is anticipated that the two onion storage facilities will be constructed at different times in accordance with the phased crop production plan, an inflation factor of approximately 10% for the first unit, and of 20% for the second, has been included, for a total of \$1,050,000. The rice dryer (also costed according to loan 042 A&E work) and a small storage collection facility in Tonosi make up the balance of \$150,000.

Requirements for farm credit, which makes up the largest single item in the loan, are based on the conventional unit requirements in Panama in accordance with the proposed production pattern, phased plan and numbers of participants. Details, as well as the projected cash flows for the BDA, are contained in Annex II. While the program calls for a significant proportion of long-term investment capital, these funds, as they are repaid, will become a

permanent source of credit funds for other AID/GOP IRD projects.

Watershed management and reforestation are analyzed for their economic and financial impact on the economy and the project area in Annex IV. The GOP will furnish the major portion of this component which consists of salary payments to laborers and other operating expenses. AID will finance a variety of small equipment and vehicles, seedlings, fertilizers and pesticides. Construction of small storage facilities for equipment and fire watchtowers will also be provided.

Pilot project funds will be used, as stated in the project description section, in the development of a variety of small projects such as fishponds, water delivery systems through mini-dams or windmills, forest products utilization and possible funding of experimental or innovative high risk crops or technologies. Economic, financial and technical feasibility information already exists for some of these activities, but market uncertainties make it advisable to begin on a pilot basis. The integrity of the BDA credit fund will not be prejudiced by the financing of experimental, high-risk on-farm projects (see Part III) because the pilot project fund will reimburse the BDA for any losses incurred on this account.

b. Recurring Costs of the Project Area

With the exception of the costs of technical staff in the Tonosi area, most of the inputs into the project represent one-time costs. The costs of the central PRODIAR and MIDA staffs are attributable to this and all future IRD projects. Land, credit, roads, technical assistance, construction and commodities will not require longer-term GOP inputs. The credit program and the farm machinery pool will be self financing. Road maintenance is expected to be the responsibility of the Municipio after the end of the project. Therefore, the only ongoing costs of the project itself will be the residual technical field staff and watershed management and reforestation. Based on present prices, they are projected at approximately \$150,000 per year for the technical field staff, for salaries and operating expenses necessary to provide a reduced but continuous level of technical assistance to project participants. Recurring costs for reforestation activities include the following items: (i) Investment: \$32,000 in vehicles and equipment (i.e., 1 truck, 2 pick-ups, light farm tractor) every 5th year beginning in year 6: (ii) technical personnel: \$21,000 annually for one each forest engineer, forester and assistant forester to supervise planting, maintenance and harvesting activities; (iii) direct plantation maintenance and harvesting costs, which will vary between \$20 and \$200 per hectare during years 6 through 10 (a detailed listing of these costs is included in Annex IV, Table 2);

(iv) an additional \$6,000 annual cost for fuels and lubricants. While costs will vary year-by-year, the annual average over the 15 years after project termination is estimated at \$110,000. These costs have been included in the internal rate of return calculations and will be partially offset by revenues from harvesting and cleanings.

To sum up, in view of the improved economic and fiscal situation expected in the country by the end of the project, the recurring costs will not represent a tangible constraint on GOP finances.

c. Five-year Disbursement Schedule

The schedule is shown in C 2 below. It represents accrued expenditures and is in agreement with the Face Sheet..

C. FINANCIAL PLAN  
1. OVERALL FINANCIAL PLAN

<u>Components</u>	<u>CONTRIBUTIONS</u>		
	<u>AID</u>	<u>GOP</u> ( 0 0 0 \$)	<u>TOTAL</u>
<u>I. Integrated Rural Development Administration</u>			
<u>A. Central Administration Support</u>			
1. PRODIAR Staff			
2. MIDA HQ. Staff	26	1457	1483
		286	286
<u>B. Information Systems for New Areas</u>			
1. Censuses & Surveys	215	411	626
2. Orthophotographic Equipment	300		300
<u>C. Technical Assistance &amp; Training</u>			
1. Training	100		100
2. Technical Assistance			
	<u>770</u>		<u>770</u>
SUB-TOTAL	1411	2154	3565
<u>II. Tonosí Area Project Development</u>			
<u>A. Field Administration</u>			
1. Administrative Expenses		1493	1493
2. Commodities	131		131
3. Construction	90	50	140
<u>B. Surveys, Studies &amp; Evaluations</u>			
	306	94	400
<u>C. Road Improvements</u>			
1. Roads & Bridges	1600		1600
2. Maintenance Equipment & Operating Expenses	25	57	82
<u>D. Agricultural Development</u>			
1. Land Redistribution & Resettlement		2500	2500
2. Farm Machinery & Facilities	700	100	800
3. Storage Facilities & Equipment	1200	750	1950
4. Credit for Sub-loans	3024	1512	4536
<u>E. Watershed Management &amp; Reforestation</u>			
1. Commodities	356		356
2. Construction	30		30
3. Maintenance & Operating Expenses		994	994
<u>F. Pilot Projects</u>			
	245	186	431
<u>G. Technical Assistance &amp; Training</u>			
1. Training	95		95
2. Technical Assistance	487		487
SUB-TOTAL	8289	7736	16025
<u>GRAND TOTAL</u>	<u>9700</u>	<u>9890</u>	<u>19590</u>

## 2. DISBURSEMENT SCHEDULE BY YEARS

Components	C O N T R I B U T I O N S										TOTAL		TOTAL
	Year 1		Year 2		Year 3		Year 4		Year 5		AID	GOP	
	AID	GOP	AID	GOP	AID	GOP	AID	GOP	AID	GOP			
- T H O U S A N D D O L L A R S -										AID	GOP		
<b>I. Integrated Rural Development Administration</b>													
<b>A. Central Administration Support</b>													
1. PRODIAR Staff	26	311		285		286		287		288	26	1457	1483
2. MIDA HG. Staff		58		57		57		57		57		286	286
<b>B. Information Systems for New Areas</b>													
1. Censuses & Surveys		106											
2. Orthophotographic Equipment	300		115	153	100	152					215	411	626
<b>C. Technical Assistance &amp; Training</b>													
1. Training	15		47		38						100		100
2. Technical Assistance	449		321								770		770
SUB-TOTAL	790	475	483	495	138	495		344		345	1411	2154	3565
<b>II. Tonosi Area Project Development</b>													
<b>A. Field Administration</b>													
1. Administrative Expenses		209		287		329							
2. Commodities	131							334		334	131	1493	1493
3. Construction	90	50									90	50	140
<b>B. Surveys, Studies &amp; Evaluations</b>	266	94	20								306	94	400
<b>C. Road Improvements</b>									20				
1. Roads & Bridges	640		800		160						1600		1600
2. Maintenance Equipment & Operating Expenses			25	20		6		15		16	25	57	82
<b>D. Agricultural Development</b>		2500										2500	2500
1. Land Redistribution & Resettlement		100										100	800
2. Farm Machinery & Facilities	665		35								700		1950
3. Storage Facilities & Equipment	150		475	750	804	402	575	237	54	27	1200	750	4536
4. Credit for Sub-loans			1694	846			472				3024	1512	
<b>E. Watershed Management &amp; Reforestation</b>													
1. Commodities	132		15		45		75		89		356		356
2. Construction	30										30		30
3. Maintenance & Operating Expenses		59		106		260		268		301		994	994
<b>F. Pilot Projects</b>			50	50	75	50	75	36	45	50	245	186	431
<b>G. Technical Assistance &amp; Training</b>													
1. Training	50		45								95		95
2. Technical Assistance	199		144		144						487		487
SUB-TOTAL	2353	3012	3303	2059	1221	1047	1197	890	208	728	8289	7736	16095
<b>GRAND TOTAL</b>	<u>3143</u>	<u>3487</u>	<u>3786</u>	<u>2554</u>	<u>1366</u>	<u>1542</u>	<u>1197</u>	<u>1234</u>	<u>208</u>	<u>1073</u>	<u>9700</u>	<u>9890</u>	<u>19590</u>

### 3. TECHNICAL ASSISTANCE AND TRAINING PLAN AND BUDGET

#### I. Integrated Rural Development Administration

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	1978				1979				Total	
	Long-term <sup>1/</sup>		Short-term <sup>2/</sup>		Long-term		Short-term		M/M	000\$
	M/M	000\$	M/M	000\$	M/M	000\$	M/M	000\$		
<u>A. PRODIAR</u>										
Rural Development Planning & Implementation	12	54			12	54			24	108
Spatial & Physical Planning	6	27			6	27			12	54
Village & Infrastructure Planning	6	27			6	27			12	54
Social & Institutional Organization			6	30			6	30	12	60
Socio-economic Evaluation			9	14			6	9	15	23 <sup>3/</sup>
Financial Analysis & Management	12	18			12	18			24	36 <sup>3/</sup>
Information Systems			3	15			3	15	6	30
Contingencies			3	15			3	15	6	30
Sub-Total	36	126	21	74	36	126	18	69	111	395
<u>B. MIDA</u>										
Project Preparation	12	54							12	54
Agronomy	12	54	3	15	6	27	3	15	24	111
Livestock & Pasture	12	54	3	15	6	27			21	96
Natural Resources and Land Use	6	27			6	27			12	54
Contingencies			6	30			6	30	12	60
Sub-Total	42	189	12	60	18	81	9	45	81	375
<u>C. TRAINING</u>										
Total PRODIAR AND MIDA									100	870

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3. TECHNICAL ASSISTANCE AND TRAINING PLAN AND BUDGET

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II. Tonosi Area Project Development

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	1978		1979		1980		Total	
	M/M	000\$	M/M	000\$	M/M	000\$	M/M	000\$
<u>A. TONOSI</u>								
<u>Long-term T/A:</u>								
Field Project Implementation	12	54	12	54	12	54	36	162
<u>Short-term T/A:</u>								
Land Tenure, Titling and Registration	6	30	3	15	3	15	12	60
Farm Management, Technology Transfer, Training, Producer Organization	12	60	12	60	6	30	30	150
Fire Control	2	10					2	10
Pilot Projects	3	15	3	15	3	15	9	45
Farm Machinery	6	30	3	15	3	15	12	60
Sub-Total	<u>41</u>	<u>199</u>	<u>33</u>	<u>159</u>	<u>27</u>	<u>129</u>	<u>101</u>	<u>487</u>
Training								
In-Service								80
External								15
Total TONOSI								<u>582</u>
Grand Total								<u>1452</u>

1/ \$4,500/month

2/ \$5,000/month

3/ National contracting at \$1,500/month

#### D. Institutional Analysis

It should be clear from the foregoing background and description that it would be highly unrealistic to attempt to predict with any real degree of assurance institutional performance in the implementation of such a complex and novel approach to rural development in an institutionally handicapped small nation like Panama. A good deal must be taken on faith on the basis of the evident political resolution, and the equally evident good will of a small number of dedicated civil servants. Moreover, this project is designed above all to help Panama establish the institutional infrastructure for carrying out this type of new activity and for testing out the various alternatives to integrated development approaches at the field level in the first impact area project.

Hence, in order not to wander into the area of unpredictability, the following brief institutional analysis is limited essentially to assessing the capability of the various institutions involved in carrying out the distinct task assigned to each.

##### 1. PRODIAR

The small current staff of PRODIAR, whose average age is in the 30s, has demonstrated a remarkable capacity for adapting to the strenuous requirements of pulling together the threads of the Tonosí project, reviewing the not always complete, objective or properly rationalized submissions from specialized participating agencies, helping to keep planning in its proper focus and looking ahead to implementation problems. Judging from their performance during the approximately two years that it has taken to gear up to the completion of the present project, they should be able to adapt adequately to the requirements of coordinating and monitoring and evaluating its implementation as well as continuing to put together five additional projects for implementation over the next two years. Nevertheless, it is quite likely that the staff will require both quantitative and qualitative strengthening at least during the next two years if they are simultaneously to cope with both responsibilities. Above all, the staff coordinator must be able to devote his full time to the effort and, if not, be assisted by a deputy of comparable capability.

It must be borne in mind that the Ministry of Planning and Economic Policy (MPPE) has not had operational responsibilities to date. However, there is reason to believe that a small special unit such as PRODIAR, operating in a certain sense as a secretariat of the High Level Commission and of the Technical Coordinating Committee, should be able to provide efficient leadership and coordination as well as implementation liaison with AID.

## 2. MIDA and Other Public Agricultural Agencies

The Ministry of Agricultural Development has been undergoing a series of reorganizations and reforms, as has the entire agricultural sector public administration, since 1970, designed to convert it into a more functional and field-oriented instrument of development, at the same time focusing its resources on a priority basis on the needs of the small farmer, with special emphasis on the joint or community production schemes. (For more detail, see Agricultural Sector Assessment, Chapter VIII, Section 4.) Since the Sector Assessment was prepared in March of 1976, some additional changes have occurred, consisting to a large extent of personnel shake-ups and new appointments to top level positions, as well as of the conversion of several directorates into "empresas" (seed production, machinery services and well drilling); the implication of the latter move is that these services are expected to be operating increasingly on a self-financing basis.

The Directorate of Sectorial Planning (DFS) has been expanded considerably and its functions as a central policy and budgetary planning and coordinating mechanism have been strengthened. Planning and implementing the Integrated Rural Development projects constitute a heavy new responsibility for this directorate. If it is to perform satisfactorily, its department of integrated rural development projects will need to be strengthened materially through upgrading of its personnel and through better liaison with the technical and regional directorates of the Ministry as well as with the other participating agricultural sector institutions. The technical assistance and training to be provided under the loan will be effective only to the degree that the Ministry makes the necessary internal adjustments.

Other MIDA directorates and "empresas" and the autonomous agricultural agencies are in general well equipped and experienced to cope with the technical responsibilities of each in field implementation under the overall coordination of the local area coordinator (see below).

The National Directorate of Agrarian Reform (DNRA) has the staff, facilities and experience to undertake the property survey and land appraisal, acquisition and redistribution on a priority basis as soon as the updated cadastral mapping and information become available. It is the Government agency responsible for issuing titles to rural land and for the administration of all public lands. The Directorate has effected the acquisition and transfer to 17,000 farmers of nearly one-half million hectares since 1969 under agrarian reform provisions of existing legislation, in addition to its more routine duties of issuing legal titles to qualified applicants.

Among the sector's autonomous institutions, both the Agricultural Development Bank (BDA) and the Marketing Institute (IMA) have more than adequate capability and capacity for servicing the Tonosí Project.

The BDA was established in early 1973, as a successor to the abolished IFE (which combined credit and marketing). It has a regional office in each province closely associated with the regional office of MIDA, as well as about 25 local offices, including Tonosí. The BDA's loan portfolio doubled from the end of 1973 to nearly \$50 million at the end of 1976. In 1976 the Bank granted a total of \$27.5 million in new agricultural loans. It has in the past implemented the credit portion of AID Loan 034 and is currently the key implementing agency for the execution of the Cooperative Development Loan (041). The BDA has also been a continuous recipient of loans for small and medium size farmer credit from the IDB, as had been its predecessor, IFE. In 1976 the BDA showed a total net operating loss of slightly over \$2 million, which is subsidized by the GOP. Part of the annual operating loss is a result of a substantial percentage of past due loans. However, this declined from over 17% in 1973 to less than 12% in 1974-1975. Like other public institutions in the sector the Bank is making serious attempts to correct even this relatively modest residue of delinquent loan portfolio. Much of it is due from asentamientos, the administration of which is being continuously improved through the introduction of farm management methods and better record keeping. Many of the institutional problems encountered with the BDA in the implementation of Loan 041 will be eliminated in this project because the administration of the Tonosí credit program will be decentralized almost entirely to the local BDA office in conjunction with the general project area team; formal loan approval will need to go no higher than the regional credit committee at Las Tablas.

The Agricultural Marketing Institute (IMA), which will be responsible for purchasing and storing virtually the entire onion output of the project as well as up to 20% of the rice output, is also well equipped to handle its part in the project. IMA was established in 1975 as an autonomous agency, succeeding, and assuming the functions, assets and liabilities of the former directorate general of Agricultural Marketing of MIDA. It has a large staff and a nationwide network of regional offices, bulk and bag storage facilities, buying points for basic grains, semiperishables and perishables, and transport. It is both the beneficiary and executing agency of AID Loan 042 which is in the process of materially strengthening the Institute's facilities and capability for buying, storing and selling the varying proportions of Panama's crops that it handles. Like the BDA, it is making serious efforts to solve its problems reflected in

high operating losses and insufficient cash flow, with technical assistance provided under Loan 042. Moreover, in case IMA's cash problems at peak harvest time have not been solved by the time the first crop is harvested in the project, project participants who sell onions or rice to IMA will be protected, insofar as their outstanding production loans are concerned, through an informal understanding between IMA and the BDA, under which the BDA does not call the loans, and does not charge interest, from the time the crop is delivered to IMA until payment therefore is made. (In the case of BDA borrowers, the checks are normally made out jointly to the bank and the borrower.)

IMA will implement its participation, on the one hand, through its regional staff at Las Tablas and, on the other hand, through its staff at the onion storage facility being installed in Aguadulce. No resident IMA representative or technician will be required in Tonosí, but IMA technicians may be needed to advise on proper field curing of onions.

Another recently created autonomous institution that will participate in the project is the Institute for Agricultural Research (IDIAP), established at the end of 1975 with the staffs of the then existing divisions of crop and livestock research in the Directorate General of Production of MIDA. The policy of the Institute is to concentrate on field level research of direct and priority impact for small farmers. It collaborates closely in many aspects with the Faculty of Agronomy of the University of Panama, on the one hand, and the Production and Regional Directorates of MIDA, on the other. It is planned to include the staff to be fielded by IDIAP to Tonosí in the overall production team in a manner similar to that used by the "Plan Puebla" approach in Mexico. A 12-month technical adviser and six months of short term consultants are about to be contracted under grant funded assistance for the Institute. It is expected that the Tonosí experience will represent a valuable, intensive field laboratory for the longer term development of the Institute's activities. The MIDA/IDIAP experimental farm and cattle herd at nearby El Ejido and IDIAP's animal experiment station at Gualaca in Chiriquí Province are expected to make an important technical input into the project. Additional technical inputs in terms of technical assistance in dairying, as well as dairy cows and bulls, will be provided by the Banco Nacional de Panama (BNP) cattle development project and the PRODEIRHA development project at Río Hato, both supported by a World Bank loan. The Compañía Panameña de Alimentos, one of the two major buyers of milk in the area, also has an active technical assistance program for its suppliers which will be available for the project, as will the recommendations of a silage production

and conservation research project sponsored by the University's department of animal nutrition.

The project's central machinery pool will be backstopped by MIDA's farm machinery service (ENAMA). This agency, created originally as a Directorate of the Ministry in 1974, <sup>1/</sup> was recently converted into an "empresa" to signify its self-financing goal. It has a central facility and ten regional pools, with a total staff of about 400 and a machinery inventory worth (at acquisition cost) about \$10-12 million. This inventory includes about 200 tractors and 100 combines, of which 80-85 percent are reported operating at any one time.

About 80 percent of ENAMA's contract work is done for joint production groups (asentamientos and juntas), at fixed hourly rates equivalent to commercial rates. These rates are being reviewed as part of a general cost and operational methods analysis designed to make the agency fully self-financing. Payments are normally received directly from the BDA as part of the producers' annual credit package. Current financial strictures due to delayed payments are a symptom of the Government's general temporary cash flow problem and are expected to be resolved by the time the project will be implemented. In any case, project management will assure that such payments are effected promptly by the BDA. Financial analysis indicates that these payments, in accordance with the project's production and credit plans, will allow the Tonosí facility to break even operationally (see Annex II).

Operational planning during the first year of project implementation, supported by technical assistance, will determine where to effect major repairs of the project machinery. Preliminary analysis indicates that these should be done at ENAMA's central facility at Santiago (about two hours by road) and/or at supplier facilities at Las Tablas. Maintenance and light repairs will be done at the Tonosí pool, and facilities for this purpose will be built, and equipment and a stock of spare parts and supplies will be provided. Insofar as possible, local people will be selected and trained as tractor drivers and mechanics' helpers.

The watershed management component of the project will be the technical responsibility of MIDA's Directorate of Natural Resources (RENARE). This agency (probably soon to be converted to another

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<sup>1/</sup> Previously, it was part of the old engineering department.

autonomous institution with its own budget, permanent source of non-budgetary income and contracting authority) has the capability for implementing the aspects assigned to it. It has a small national and regional staff of experts in watershed management, forest protection and reforestation, as well as in water management and irrigation. All of its forestry specialists are foreign trained inasmuch as Panama has no training facilities for this discipline at any level. RENARE had been making commendable progress in producing seedlings and tree nurseries and in reforestation but, owing to a serious budget cut, was able to reforest a total of only about 70 hectares in 1976. On the other hand, the agency has acquired substantial experience in the management of "agro-forest" projects for improvement of subsistence levels and resource protection and rehabilitation in mountainous areas. Moreover, it has devoted a good deal of its resources to studying and planning the protection of the Panama Canal watershed and the adjacent watershed of Lake Alajuela which provides potable water for the city of Panama and the Canal Zone, in anticipation of a new canal treaty which would transfer responsibility for protection of these watersheds to the Government of Panama. The experience to be developed by RENARE in Tonosí as a result of the additional external and internal resources that will be channelled to it through the project will therefore be of utmost importance for equipping it to carry out its expanded responsibilities in the near future, particularly in view of the increasing concern at the political level with the protection of the remaining forest land on the Pacific and Atlantic slopes and in the virtually virgin territories of the Darien. It is expected that the hydrologic studies will be contracted with the public corporation for water resources and electricity (IRHE) which has both the equipment and the technical capability for carrying them out. To the extent that ground water aquifers of sufficient size are located, the well drilling department of MIDA will be called in. This agency drilled a total of 99 wells between 1973 and 1976, more than half of them in 1976.

Most of the improved seed to be used in the project will be supplied by MIDA's seed production service (Empresa Nacional de Semillas) from lines approved by IDIAP or developed by IDIAP or the Faculty of Agronomy. The seed service, recently converted into an "empresa" with a view to eventual financial self-support, has adequate facilities and staff to service the project and will give priority to the project requirements. The service receives intermittent assistance from a centrally AID-funded T/A project of the University of Mississippi.

Some seed, and the bulk of the chemical inputs and feed concentrates for the project, will be supplied by the Confederation of Agricultural Cooperatives (COAGRO). COAGRO has been importing and supplying such inputs for some years for the agrarian reform group farming

organizations and for certain State enterprises such as the sugar plantations. It is also managing a feed mill at Chitré, two hours by road from Tonosí, and it has a general warehouse at El Espinal (halfway between Chitré and Las Tablas) which will be used to store the bulk of the supplies for the project (except for a small current inventory to be stored at the project site). COAGRO was described and analyzed in detail in the CAP for Loan 041 submitted in 1974. It is the principal beneficiary federation of this loan. A new manager was appointed in 1977.

Two institutions are mainly responsible for the improvement and updating of information systems for Tonosí and for the additional impact areas: the Geographic Institute "Tommy Guardia" and the Department of Statistics and Census (DEC) of the Controller General of the Republic. Both are among Panama's most highly developed and efficient public institutions. They have demonstrated their capacity for supporting this project by completing new aerial photography for Tonosí (Geographic Institute) and field enumeration of new district population, housing and agriculture censuses (DEC) which are being processed for tabulation before the end of the year. The US Census Bureau is providing intensive service and technical assistance to the DEC effort with AID grant funds (as described in Part III) and additional funds will be provided by the loan. The loan will also provide modern orthophotographic equipment for the Geographic Institute to enable it to update cadastral surveys more quickly and at lower cost in the future.

### 3. Field Implementation

The greatest institutional uncertainties are inherent in the quality of the field implementation apparatus. The relative success of the Tonosí project will probably have an important bearing on the degree to which the IRD program will continue to receive full political backing as well as external financial support. Its success will depend in very large measure on one person: the Area Coordinator. In view of the absence of experience in Panama with the kind of project proposed it is of course not possible to predict the performance of various candidates available for appointment to this position. The appointment will therefore be based largely on appraisal of the candidates' general level of intelligence, personality and experience as well as on their previous knowledge of the area and its people, and it should be, insofar as human possible, a definitive selection; frequent changes of field project management can have extremely disruptive consequences.

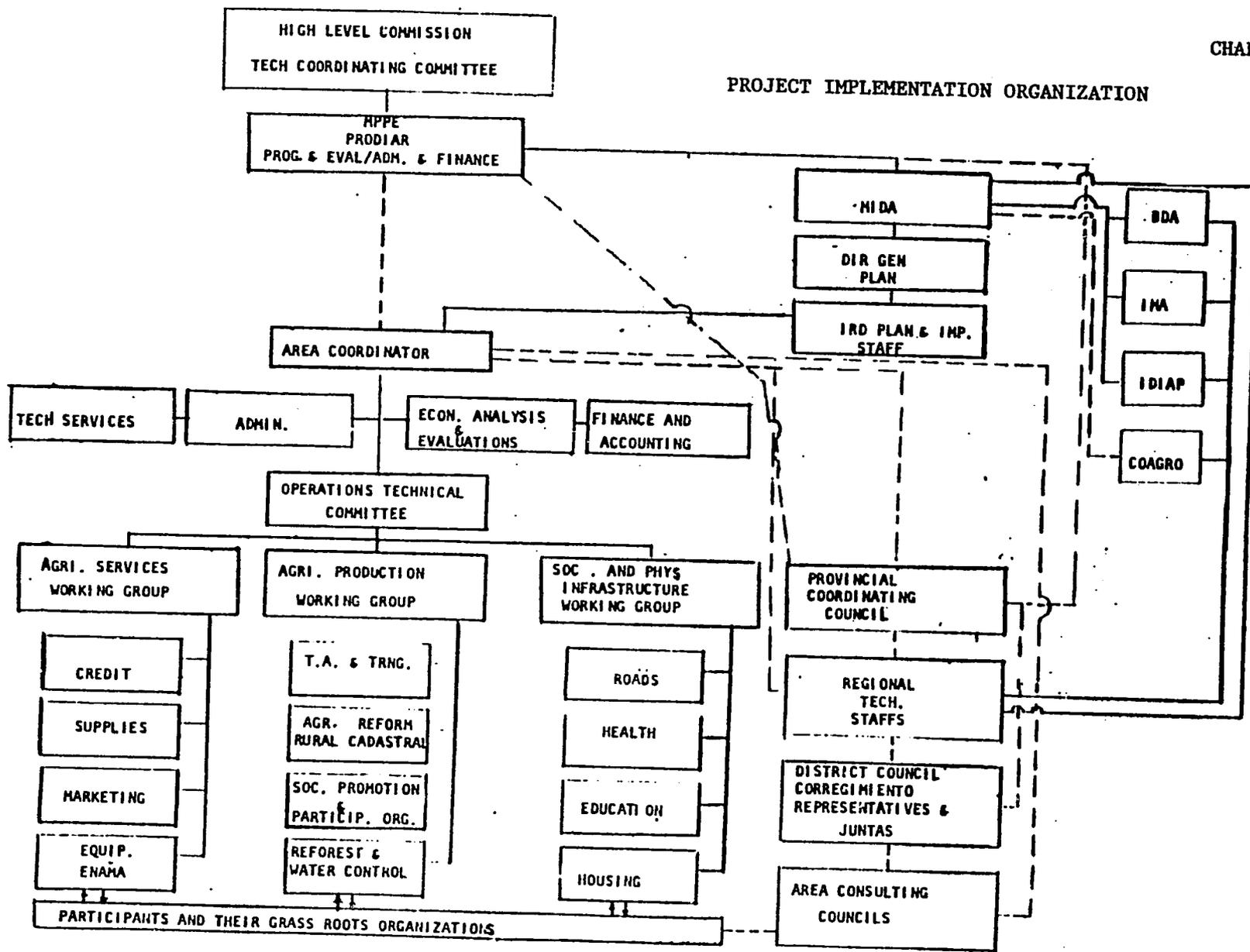
The field coordinator must not only have a certain level of technical competence in at least one of the major fields of implementation; he must be above all a good manager of teams and technical systems and be able to develop real rapport with the participant population based on mutual understanding of goals and of potential and limitations for

their achievement. While he must be able to rely on the specialized skills and judgments of personnel under his direction and/or coordination, he must also be able, when required, to adapt desired technology to overall project objectives and goals. Furthermore, he must be receptive to external advice (assuming, of course, that such advice is qualitatively appropriate and adapted to local realities) and capable of transmitting such receptivity to the rest of the field staff. There is a serious shortage of experienced technical staff in Panama (the average age of the resident Tonosí staff is unlikely to exceed 30 and none are likely to have more than a Panamanian degree of Ingeniero Agrónomo or veterinarian). Thus, technical assistance, and the in-service training related to it, will have to play a major role in assuring quality field project implementation. Few if any Panamanian human resources can be diverted to long-term foreign training (as distinct from orientation travel and short courses) in this project. The quality of the long-term technical assistance adviser to the Area Coordinator will thus be at least as important for the success of the project as that of the Coordinator himself. He will have to be chosen with perhaps even more care than in the case of the Coordinator, especially since the field of choice - being practically world-wide - is immensely broader; and the choice should be definitive because discontinuity in this position would be just as destructive as in the case of the host country manager.

As the first integrated rural development area, Tonosí will, of course, benefit from a level of technical assistance and training substantially greater than what will be required for future projects. It is assumed that the GOP will make every effort to assure that host country personnel will receive maximum exposure to these benefits and that the accumulated experience will be brought to bear on the planning and implementation of future projects.

As discussed more fully under Project Description (pp. 48-47), the Area Team, under the direction of the Area Coordinator, will provide training, technical assistance and farm credit planning in an integrated package. To the extent practicable, these services will be provided on a group basis, even where there is no formal group production or credit arrangement among project participants. The technical staff, as graphically depicted in Chart IV-1, describes the composition and the inter-relationships of the area agricultural team which will be composed of specialists in agronomy, dairy production, veterinary science, forestry, credit, social organization and farm management. Approximately one-half will be professional personnel with university degrees, and the rest will be middle-level field technicians trained at appropriate Panamanian or foreign institutions.

PROJECT IMPLEMENTATION ORGANIZATION

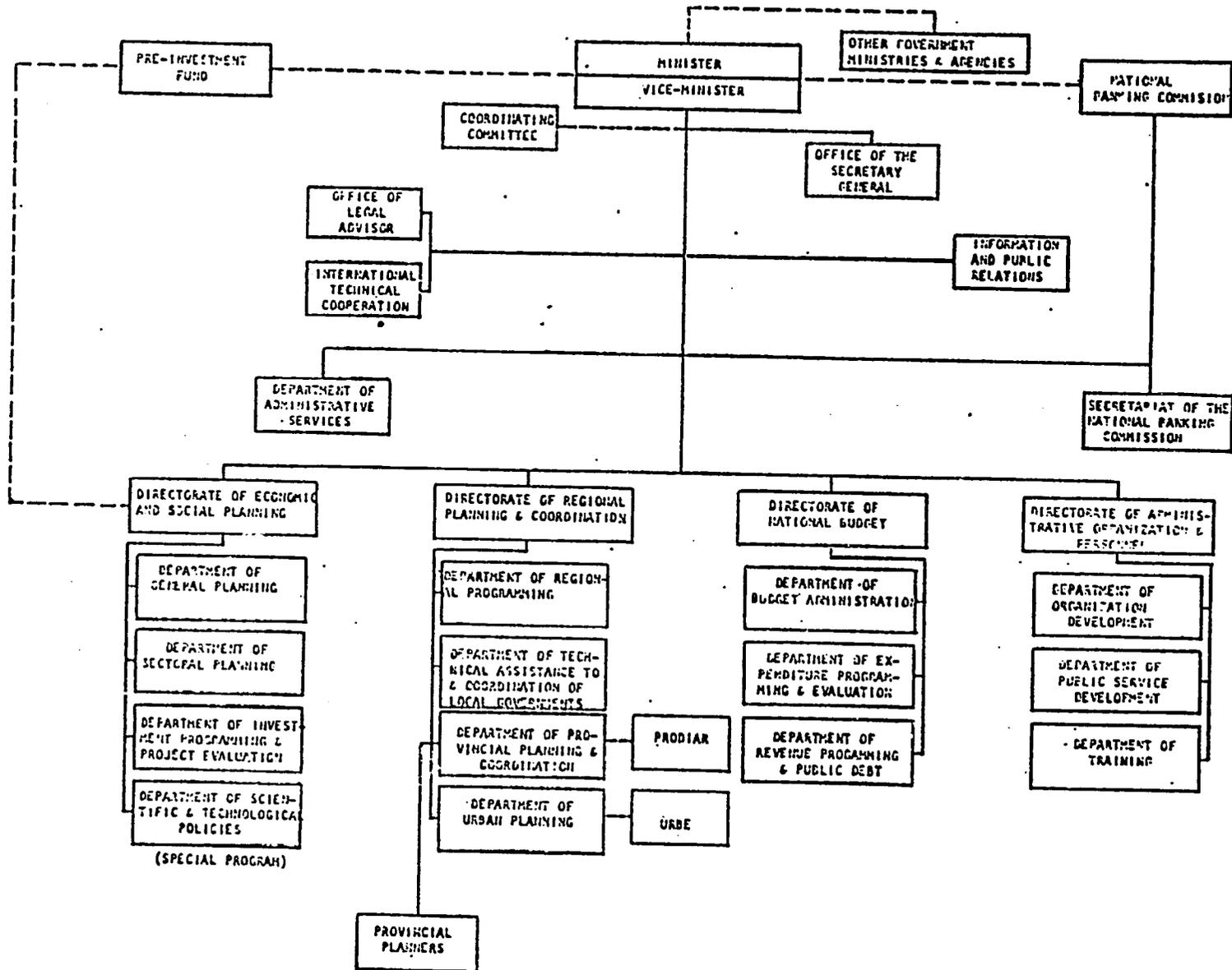


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ORGANIZATION OF MINISTRY OF PLANNING AND ECONOMIC POLICY (JANUARY 1977)

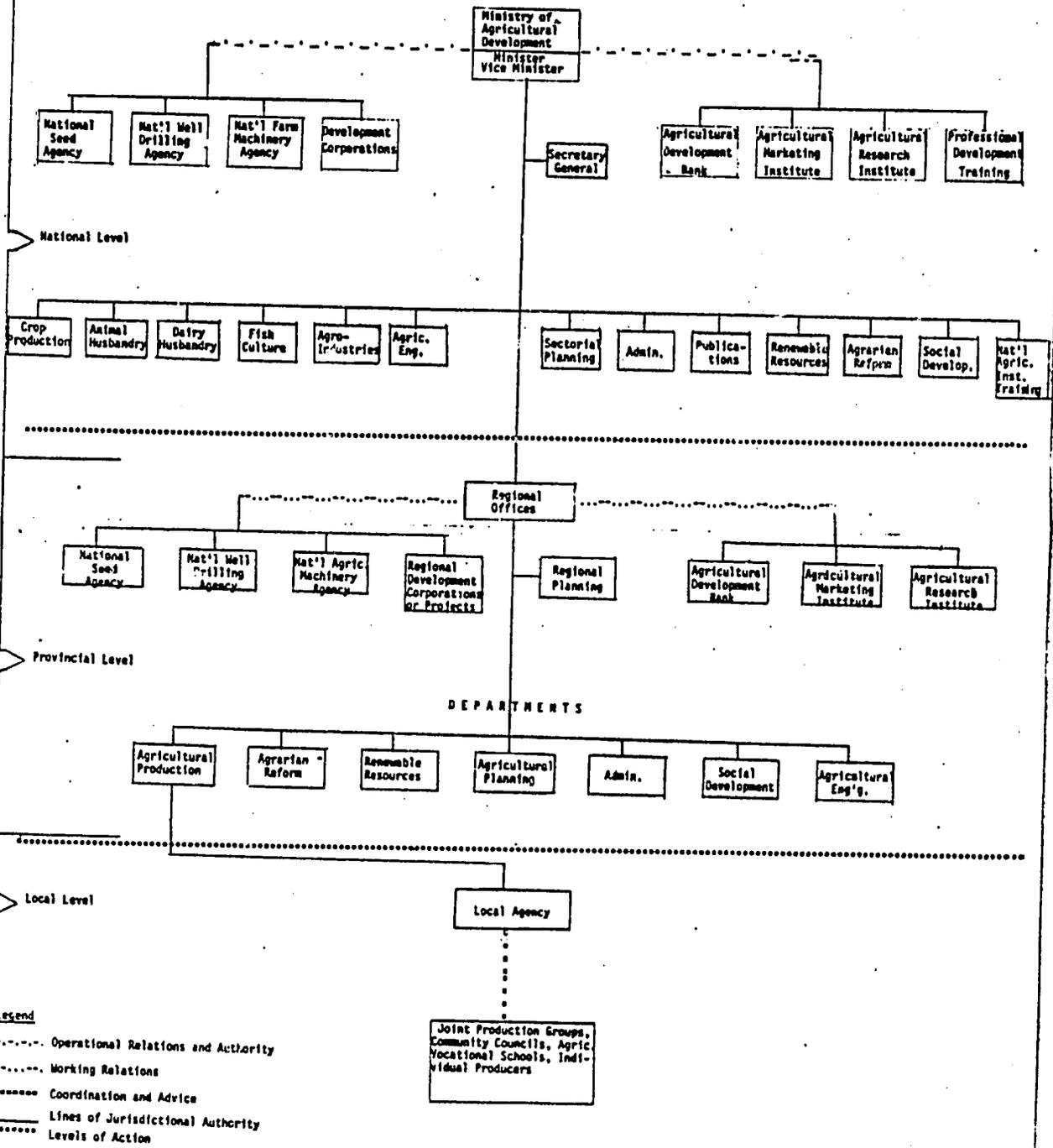
CHART IV-2



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PANAMA: ORGANIZATION OF PUBLIC ADMINISTRATION OF THE AGRICULTURAL SECTOR (February, 1977).

Chart No. IV-3



## V. IMPLEMENTATION PLAN

### A. Strategy and Phasing

The history of rural development projects of even lesser complexity than those proposed for Panama is replete with failures. These failures have been ascribed in ex post evaluations and studies essentially to five factors: (1) unmanageable size of the area and population; (2) initial over-design, often based on inadequate information and faulty perception of realities and priorities; (3) excessive concern with rates of physical implementation and disbursement; (4) insufficient or no participation by the client population; (5) indiscriminate introduction of new technology without first asking whether technology was the answer and if so; what kind would best fit into the ecological, socio-economic and cultural milieu. Projects also have been criticized for their inability to materially improve the condition of the rural poor while perhaps achieving most other project goals and purposes. Many other rural development projects backed by external financial and/or technical assistance have under-achieved because the assistance was provided to non-viable national institutions and the assistance itself was institutionally marginal.

The project has been designed to avoid these pitfalls through the creation of an organizational framework, limiting the size of the project and capable of making selective interventions. Examples of this are: (1) Tonosí is a relatively small area and this, in itself, facilitates project management, (2) emphasis is given to the early updating of information on which the project's micro-design is based; (3) project organization integrates decision-makers and implementing agencies around a common objective; (4) local institutions are strengthened to ensure participation by the client population, and (5) the fundamental focus of the project is to provide the rural poor above all with an adequate resource base upon which their socio-economic development can be built, at a rate commensurate with their perceived needs and absorptive capacity.

The overall framework for the implementation of this area project is one of phased and integrated execution of a series of partly discrete activities, each complementing the others and some representing steppingstones for moving to the next.

The strategy for the initial five years of area development which comprise the project is to reach a first plateau of economic and social development, as described in the EOPS, through coordinated improvement of infrastructure and social services, providing the rural poor with adequate land resources, and upgrading their human potential and income levels through a gradual process of innovative, integrated training, technical assistance, credit use and social

organization for individual and joint participation in the process.

While the higher-level income strata will not be precluded from obtaining fringe benefits from the initial phase, all resources during the first five years of the development effort will be concentrated explicitly on the rural poor as the target group with a minimum target net income of \$2,000 per farm family. 1/

The longer-term framework for the area's development envisions further increases in the added value of farm production during the subsequent 5 years. The project will broaden in scope, affecting the less poor to achieve an average net family income per capita of projected agricultural population to about \$800 (at 1976 prices), from an estimated average of \$460 in 1976.

This will be made possible largely by the research and experience base built up during the life of the project, among both technicians and producers, and by the probable doubling of the irrigated area based on longer-term, accurate stream flow data, ground water exploration, the initial effects of upstream conservation measures, and the water use discipline to be introduced by the project. The longer-term framework also includes the introduction of substantial diversification of production based on high-value crops that will gradually replace much of the traditional production pattern, and on local processing of the higher value crops.

The project is designed for a five-year disbursement period because (1) institutional inexperience will require a substantial lead time for staffing, organizing and training the field implementation apparatus; (2) individual participant identification, land reform and detailed farm planning must await certain information updating and refinements that are not expected to be completed until well into 1978, and (3) agricultural operations, as in most areas of the world, are sharply circumscribed by climatic factors.

#### PHASE I

The development strategy being pursued requires that all elements (especially institutional) needed for implementation be put

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1/ The accrual of direct benefits to non-participants from road improvement is, of course, unavoidable as well as desirable provided it does not include speculative land price increases.

into place prior to undertaking actual project development activities except road improvement. During the first phase of the project those elements are:

1. At the central institutional level, a mechanism must be organized that brings together decision-making and implementing institutions. A consensus at this level of objectives to be pursued will ensure consistent rural development policies and directives from the highest decision-making level to field implementation.

This element refers to the roles of the High Level Commission, Technical Planning and Coordinating Committee, PRODIAR, and MIDA's Directorate General of Sectorial Planning.

2. At the area impact level, a mechanism must be created that will coordinate the efforts of all organisms participating in the integrated rural development strategy, thus assuring that the activities complement one another and avoiding duplication. This will be the role of the Area Coordinator and his team. The Coordinator will be directly linked to the central mechanism through (a) MIDA's Directorate General of Sectorial Planning, (b) the Provincial Coordinating Council, and (c) direct access to the Coordinator of PRODIAR, and indirectly through communication lines between specialized field personnel and regional and central offices of the participating organisms.

3. A decentralized Area Consultative Committee at the Tonosí level will encourage more active participation by the client population and ensure that their needs are articulated. Formation of this Committee is one of the seeds for a more powerful regional level decision-making authority responding to regional development needs.

In addition to the institutional/organizational framework that will be created during the first year (i.e., recruiting, training and orienting field staff and establishing close contact with participant population in order to better serve their felt needs and aspirations and begin the motivation effort) activities that will refine or update basic information and provide essential infrastructure will also be undertaken:

- a. Information analysis from the census, cadastral mapping and socio-psychological survey needed for land redistribution and other operational decision making, will be completed;

- b. Improving approximately one-half of the total road network programmed for improvement under the project;

- c. Constructing project staff offices and housing and a farm machinery pool, and procuring vehicles for project staff and farm machinery for the 1979 planting season;
- d. Initiation of technical assistance and training;
- e. Acquisition of all land to be redistributed and resettlement of at least 60% of potential project participants; and
- f. Designing an operational plan for year 2 implementation.

For a more detailed scheduling of these activities see the PERT Network, Annex I E.

## PHASE II

During the second phase, project elements related to target group activities in the Tonosí area will begin. Agricultural operations are scheduled to begin in earnest during the planting season that starts with the onset of the rains in May, 1979; however, to the extent that resettlement can be accelerated (or is not needed in specific cases) and that other conditions allow, a beginning may be made already in 1978 in creating some dairy units and in dry season cropping.

In essence the following activities will be undertaken during Phase II (these will be more fully developed in the Implementation Plan designed during Phase I):

1. Credit will be made available to project participants to finance dairy and crop production activities.
2. Technical assistance will be provided to project participants in needed subjects (farm management, credit planning), and new technologies will be introduced gradually to improve dairy and crop farming.
3. Milk cows will be obtained from existing herds.
4. Reforestation activities will begin.
5. Various farm models will be tested with project participants and, ultimately, be used on a more widespread basis.
6. The overall implementing mechanism will be improved through continuous interventions directed toward benefitting the project participants.

B. AID Project Monitoring and Administration Responsibilities

1. Monitoring Responsibilities

The USAID Agriculture and Regional Development Sector will have the primary responsibility for monitoring the project's implementation, assisted by the Office of Development Planning, Controller, and by the Office of Engineering Services and the Contract Officer. The Project Team, composed of officers from each of these divisions - and others as appropriate - will review all procurement lists, plans and specifications (including those regarding training and technical assistance); periodically inspect construction progress on roads and buildings; ensure that disbursement/reimbursement requests conform to A.I.D. regulations, that sound financial control methods are followed, and that provisions of the Loan Agreement and Implementation Letters are satisfactorily met.

Periodic visits to the Tonosí area will be undertaken to ensure that technical assistance, training and other inputs provided by the project are being adequately utilized. Project officers will maintain close contact with counterpart personnel in both PRODIAR in Panama and MIDA's Directorate General of Sectorial Planning in Santiago to assist in implementation and assure that any problems are immediately resolved. Periodic review meetings with GOP counterparts will be scheduled, and AID representation will be invited, as appropriate, to the meetings of the High Level Commission, the Technical Coordinating Committee, the Provincial Council and the Area Consultative Committee.

2. Disbursement Procedures

A five year disbursement period will be needed in order for the Borrower to draw down loan funds for the contemplated construction activities, equipment, production and investment credit, training and technical assistance. A five year period is especially important since the agricultural development activities in the Tonosí area will not get under way until the second year of implementation.

Because funds will be used for a wide variety of activities, different disbursement procedures will be used depending upon the nature of the activity.

a. Road Construction: Though unit costs may differ for different roads, the FAR procedures will be used <sup>1/</sup>Also, in the event inflation or unanticipated cost factors significantly increase unit costs, a renegotiated unit cost agreement may be effected on an annual basis and formally established through an Implementation Letter.

1/ No other component of the project has a sufficient number of replicable units susceptible to FAR disbursement method.

b. Credit: Quarterly advances, based upon anticipated disbursement schedules, will be made to the BDA for financing the fixed investment, production credit, and other working capital needs of the project participants.

c. Farm Machinery: While it will be purchased over a three year period, the Mission will encourage the GOP to request a single IFB for all needed farm machinery. This will simplify the bidding procedure, assure delivery and uniformity of the equipment, and increase the possibility of preferential price. It is likely that the Letter of Commitment procedure will be used for this procurement.

Disbursements for other activities financed under the Loan - e.g., studies, training and technical assistance, other equipment and construction - will be done in accordance with standard AID procedures.

### 3. Procurement Procedures

The selection of consultants and contractors, procurement of equipment and materials, shipping and insuring shall be carried out in accordance with the standard procedures called for in the Loan Agreement. It is anticipated that most goods and services procured under the Loan will be contracted directly by the Borrower, with AID's prior concurrence for those items not funded under the FAR system.

Appropriate reports will be obtained concerning procurement requirements, including 50/50 shipping and source/origin. These reports and requirements will be monitored by the Office of Development Planning and the Controller's Office through review of vouchers and supporting documentation submitted in substantiation of reimbursement requests.

### C. Evaluation Plan

Annual evaluations will be undertaken in conjunction with PRODIAR, MIDA, and field personnel to make judgments concerning progress toward the achievement of the project's purposes. Annual reviews will be held between PRODIAR/MIDA and AID to evaluate the project's progress and reprogram targets as necessary. These evaluation meetings will also provide a convenient forum for reviewing compliance with conditions and covenants set forth in the Loan Agreement and agreeing on corrective measures if necessary.

In addition, three major socio-economic surveys following years 1, 2, and during year 5 of the project will be funded. Relevant data generated from these surveys will be used in project evaluations, and may include:

1. changes in land tenure and use patterns;
2. natural resource utilization and management;
3. changes in small farmer technology;
4. changes in income and employment;
5. changes in attitudes;
6. effects of the improved road network in the district and marketing implications; and
7. emergence of new employment and income producing activities.

Some of the baseline data on which progress can be evaluated is currently being generated by the census, cadastral mapping and socio-psychological survey. Other data (not included in these exercises) will be forthcoming as a result of the year 1 survey and will be used as baseline data for evaluation after years 2 and 5.

The findings of these evaluations will be used in modifying the implementation plan and, to the extent required, redesigning project components.

## PANAMA: INTEGRATED RURAL DEVELOPMENT - TONOSI

APPENDIX

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- A. Mission Director's Certification
- B. Letter of Application
- C. Interim Report Approval Cable
- D. Logical Framework
- E. PERT
- F. Draft Project Description
- G. Draft Loan Authorization
- H. Statutory Checklist

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- 1. Summary
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    - iii. Assumptions for Farm Model Analysis

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- b. Project Costs
- c. Sensitivity Analysis

## 5. Rationale for Target Income

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- 1. Financial Viability of Machinery Pool
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- Table 2e: TONOSI: Farm Models 1, 2, and 4, Detailed Investment Costs and Assumptions
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- Table 10: TONOSI: Dairy/Beef Farm - Herd Projection
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- Table 12: TONOSI: Dairy/Beef Farm, Detailed Investment Cost
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- Table 16: Ortho-Photographic Equipment List
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- Table 19: Cost of Onion Storage Facilities
- F. Supplementary Statistical Profile of Farms in Tonosí, with Special Reference to Target Group
- Table 1: TONOSI: Number and Area of Farms by Tenure Status and Size, 1970
- Table 2: TONOSI: Area of Principal Crops by Farm Size, 1970
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    - 2. Description of Project Activities
    - 3. Costs
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    - 5. Economic Appraisal of the Reforestation Sub-Project
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- 3. Analysis of the Existing Social Structure
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6. Communications Strategics and Local Participation
  7. Social Consequences and Benefit Incidence
  8. Conclusion

ANNEX VI - MAPS, CHARTS AND FIGURES

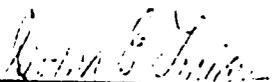
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| Map 2.B. | TONOSI: Present Land Use   |
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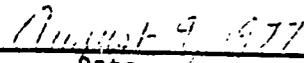
ANNEX VII - ENVIRONMENTAL EXAMINATION

CERTIFICATION PURSUANT TO SECTION 611 (e) OF THE  
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Irving G. Tragen, the principal officer of the Agency for International Development in Panama, having taken into consideration among other things, the maintenance and utilization of projects in Panama previously financed or assisted by the United States, do hereby certify that in my judgement Panama has both the financial capacity and the human resources capability to effectively maintain and utilize the proposed capital assistance project for the development of an integrated rural development project in the Tonosí area and a system capable of replicating such a project.

This judgement is based on the facts presented in the Project Paper and the Mission's previous experience with the Ministries of Planning and Economic Policy, Agricultural Development, Health and Education of Panama including assistance in Agriculture, Health, Education and Planning as well as experience with loans to other autonomous and semi-autonomous agencies of the Government of Panama.

  
\_\_\_\_\_  
Irving G. Tragen  
Director, USA ID/Panama

  
\_\_\_\_\_  
Date

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Annex I - B

REPUBLIC OF PANAMA  
Ministry of Planning and Economic Policy

Panama, August 15, 1977

Irving Tragen, Director  
United States Agency for  
International Development

Dear Sir:

As you are aware, since November 1973 the Government of Panama has been making the necessary studies prior to the implementation of a program for integrated development of rural areas. This program, which will be the basis for planned regional development in Panama, is a policy instrument of the highest priority within the regional development strategy.

Your agency has from the beginning been associated with the technical studies which served as a basis for the October 1975 Interim Report on the projects in Tonosí, Ponuga, Las Minas-Los Pozos, and Costa Arriba de Colón-Mandinga. Of these, the Tonosí project is the first to have a completed feasibility study.

Against this background, the Government of Panama reiterates to AID its desire to open formal negotiations in order to formalize a request for a US\$ 9.7 million loan for partial financing of the following components.

- 1. Institutional mechanism PRODIAR, US\$ 1.4 million;
- 2. Tonosí area project, US\$ 8.3 million.

The program components are fully known to you. The cost of these is approximately US\$ 19.6 million, of which we are requesting 49.5% in financial assistance from AID. The remaining portion will be financed by the Government of Panama. The financial requirements include the internationally accepted factor for cost increases due to inflation.

We would request that the financial conditions adhere to the agreements previously accepted by both sides, which provide for the following: A 20-year loan including a 7-year grace period; an annual rate of interest of 2% during the grace period and 3% during the period of amortization.

In order to implement the project, the Government of Panama has adopted an institutional mechanism which has already been fully discussed with AID experts and which clearly identifies the parties responsible for implementing the program.

Sincerely,

[Signature]

Nicolás Ardito Barletta  
Minister

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US AID/PANAMA



Annex I - B

*República de Panamá*

*Ministerio de Planificación y Política Económica*

Panamá, 15 de agosto de 1977

Don  
Irving Tragen  
Director de la  
Agencia Internacional para el Desarrollo  
E. S. D.

Estimado Señor Director:

Como es de su conocimiento, desde noviembre de 1973 el Gobierno Nacional viene realizando los estudios pertinentes con el objeto de poner en ejecución un Programa de Desarrollo Integral de Areas Rurales, que servirá de base al desarrollo regional planificado de Panamá y que a la vez constituye un instrumento de la política de más alta prioridad contemplada en la Estrategia Regional de Desarrollo.

En este sentido, la Agencia que usted dignamente dirige ha estado vinculada desde el principio a los estudios técnicos que sirvieron para que en octubre de 1975 se presentase el Reporte Interino para los proyectos de Area de Tonosí, Ponuga, Las Minas-Los Pozos, Costa Arriba de Colón-Mandinga. De éstos, el proyecto de Tonosí es el Primero en tener su estudio de factibilidad terminado.

Basados en estos antecedentes, el Gobierno Nacional desea reiterar al AID su deseo de iniciar las negociaciones formales para concretar la solicitud de un empréstito por la suma de US\$9.7 millones con la finalidad de financiar, parcialmente, los siguientes componentes:

1. Mecanismo Institucional PRODIAR US\$1.4 millones
2. Proyecto de Area de Tonosí US\$8.3 millones

Los componentes de dicho programa son ampliamente conocidos por usted y tendrán un costo aproximado de US\$19.6 millones, de los cuales el 49.5% se le está solicitando como asistencia financiera al AID; el resto

.../

será financiado mediante contrapartida aportada por el Gobierno Nacional. Los requerimientos financieros incluyen los aumentos del costo por inflación, internacionalmente aceptados.

En cuanto a las condiciones financieras, deseáramos que a las mismas se ajustaran a los acuerdos previamente aceptados por ambas partes y que son del tenor siguiente: el préstamo por 20 años incluyendo los 7 años de gracia. La tasa de interés será de 2% anual durante el período de gracia y 3% de interés anual durante el período de amortizaciones.

El Gobierno Nacional ha adoptado, para la ejecución del proyecto, un mecanismo institucional que ha sido discutido ampliamente con los técnicos de la AID, en el cual se define claramente quiénes son los responsables de la ejecución de dicho programa.

Atentamente,



NICOLAS ARDITO BARLETTA  
Ministro

# 149 CHRONO TELEGRAM DEPARTMENT OF STATE

ANNEX I - C

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 CHRON AIDAC

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6/29/76 SUBJECT: DAEC REVIEW - AGRICULTURAL SECTOR ASSESSMENT AND INTERIM REPORT: INTEGRATED RURAL DEVELOPMENT PROJECT.

SUMMARY: THE DAEC REVIEWED THE AGRICULTURAL SECTOR ASSESSMENT AND THE INTERIM REPORT FOR THE INTEGRATED RURAL DEVELOPMENT PROJECT ON APRIL 14, 1976. IT WAS DETERMINED THAT THE ASSESSMENT WAS ACCEPTABLE IN THAT IT PROVIDED THE RATIONALE FOR THE GOP'S INTEGRATED REGIONAL STRATEGY AND THE MISSION'S SUPPORT OF THAT STRATEGY. BEFORE FINAL APPROVAL, HOWEVER, FURTHER WORK REMAINS TO BE DONE IN IDENTIFYING AND ANALYZING PROBLEMS AT THE MICRO-LEVEL CONFRONTING THE TARGET GROUP. IT WAS AGREED THAT THE GENERAL INFORMATION PROVIDED ON THE TARGET GROUP WOULD BE SUPPLEMENTED. IN REVIEWING THE INTERIM REPORT, THE DAEC FOUND THAT WHILE A GOOD START HAD BEEN MADE IN PLANNING FOR THE TONOSI AREA, A SIGNIFICANT AMOUNT OF PROJECT ANALYSIS REMAINED TO BE UNDERTAKEN, PARTICULARLY AT THE OPERATIONAL LEVEL. IN ADDITION, THE INSTITUTIONAL MECHANISM WAS STILL TO BE DEVELOPED. THE DAEC CONCLUDED THAT AN INSUFFICIENT BASIS EXISTED AT THE PRESENT TIME (NOR COULD ONE BE DEVELOPED BY AUGUST) TO SUPPORT A 39.0 MILLION DOLLAR PROGRAM (19.5 MILLION DOLLARS AID AND 19.5 MILLION DOLLARS GOP) THE DAEC WAS WILLING TO CONSIDER A TOTAL POTENTIAL LOAN COMMITMENT OF 15 MILLION DOLLARS SUBJECT TO THE AVAILABILITY OF FUNDS AND THE RESULTS OF DETAILED FEASIBILITY STUDIES. INTENSIVE REVIEW FOR A PROJECT PAPER (PP) FOR A LOAN OF UP TO 7 MILLION DOLLARS WAS AUTHORIZED FOR SUBMISSION IN EARLY AUGUST TO HELP FINANCE AN INITIAL PROJECT TO (A) CREATE A CENTRAL PLANNING AND ADMINISTRATION MECHANISM, (B) CARRY OUT AN INTEGRATED DEVELOPMENT PROGRAM FOR THE TONOSI AREA, AND (C) PROVIDE FOR DATA COLLECTION AND PLANNING IN THE REMAINING FOUR IMPACT AREAS. WHILE THE DAEC IS PROGRAMMING

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UP TO 7.0 MILLION DOLLARS, IT QUESTIONED WHETHER A NEED EXISTED FOR THAT AMOUNT SINCE THE SCOPE OF THE INITIAL PROJECT HAS BEEN REDUCED. ONCE THE ADMINISTRATIVE ORGANIZATION HAS BEEN ESTABLISHED AND IS FUNCTIONING AND REGIONAL PLANS HAVE BEEN DEVELOPED FOR THE OTHER AREAS, A SECOND PP SHOULD BE SUBMITTED FOR FY 77 OR FY 78 FUNDING.

2. ASSESSMENT. IT WAS AGREED THAT THE ASSESSMENT PROVIDED THE THEORETICAL RATIONALE FOR THE GOVERNMENT'S INTEGRATED RURAL DEVELOPMENT STRATEGY, I.E., GIVEN LIMITED GOVERNMENT RESOURCES, MAJOR TARGET GROUP CONSTRAINTS COULD BE IDENTIFIED WITH GREATER PRECISION AND ADDRESSED IN A COORDINATED MANNER AND WITH GREATER SPECIFICITY ON A GEOGRAPHIC AREA BASIS THAN IS POSSIBLE ON A NATIONAL PROGRAM BASIS. THIS WAS PARTICULARLY TRUE GIVEN THE GOVERNMENT'S POOR EXPERIENCE WITH NATIONAL PROGRAMS TO DATE. HOWEVER, THE LACK OF INFORMATION ON THE TARGET GROUP AND ITS PARTICULAR AND UNIQUE PROBLEMS IN ANY OF THE IMPACT AREAS (E.C. LAND TENURE, PRINCIPAL PRODUCTION, HEALTH PROBLEMS, ETC) PREVENTED THE ASSESSMENT FROM DEMONSTRATING CONCRETELY THAT AN INTEGRATED, GEOGRAPHIC-SPECIFIC, REGIONAL STRATEGY IS IN FACT MORE EFFECTIVE IN IDENTIFYING AND ADDRESSING TARGET GROUP PROBLEMS. FURTHER MICRO-LEVEL ANALYSIS OF THE TARGET GROUP FOCUSING ON ITS PROBLEMS IN ATTAINING PRODUCTIVITY INCREASES AND ON ITS SOCIO-ECONOMIC PROBLEMS SHOULD BE CONDUCTED. SUCH AN ANALYSIS SHOULD BE INITIATED IN TONOSI AND BE INCLUDED IN THE PP; SUBSEQUENT ANALYSES SHOULD BE UNDERTAKEN IN THE OTHER IMPACT AREAS AND BE INCLUDED IN A TARGET GROUP SUPPLEMENT TO THE SECTOR ASSESSMENT. THIS SUPPLEMENT SHOULD BE SUBMITTED NO LATER THAN THE SECOND PP FOR THE ADDITIONAL COMPONENT OF THE PROJECT OVER 7.0. MILLION DOLLARS.

IN DISCUSSIONS SUBSEQUENT TO THE DAEC WITH MISSION REPRESENTATIVES IT WAS AGREED THAT THE ANALYSIS SHOULD START WITH A DESCRIPTION OF THE TARGET GROUPS SOCIO-ECONOMIC CHARACTERISTICS AND DESCRIBE AND ANALYZE NEEDS FOR INCREASING AGRICULTURAL PRODUCTION, AND IMPROVING HEALTH, EDUCATION, AND HOUSING STANDARDS AS IDENTIFIED BY THE TARGET GROUP ITSELF. FOR TONOSI, THIS COULD INVOLVE EITHER A SURVEY OR CASE STUDY METHODOLOGY, FOR THE REMAINING AREA THIS COULD WELL REQUIRE A SURVEY. IT WAS POINTED OUT THAT THIS ANALYSIS SHOULD FOCUS SPECIFICALLY ON NEEDS OF WOMEN IN THE TARGET GROUP AS WELL.

3. AGRICULTURAL PRODUCTION STRATEGY. IT WAS NOTED THAT THE PRODUCTION STRATEGY IN THE PLAN PERSPECTIVO CALLING FOR WITHDRAWAL OF MARGINAL LANDS FROM PRODUCTION AND INTENSIFYING PRODUCTION ON BETTER LANDS IS NOT NECESSARILY INCONSISTANT WITH CONCENTRATING RESOURCES ON THE TARGET GROUP, I.E., MARGINAL FARMERS IN THE IMPACT AREAS. HOWEVER, IF SUCH A PRODUCTION STRATEGY IS CONSCIOUSLY PURSUED

IN EACH AREA THEN LAND REFORM TO ENSURE ACCESS OF THE TARGET GROUP TO BETTER LAND WILL BECOME A CRUCIAL PROGRAM ELEMENT. LAND TENURE PATTERN AND REQUIRED CHANGES, IF ANY, WILL THEREFORE HAVE TO BE ANALYZED IN EACH IMPACT AREA. FOR ANY SUCH ELEMENT INCLUDED IN THE PROJECT, THE PP SHOULD EXPLAIN HOW FARMERS WILL BE MOVED OFF MARGINAL LAND INCLUDING ANY SOCIOLOGICAL EFFECTS.

4. NATIONAL AND REGIONAL POLICIES. WHILE MANY PROBLEMS CAN EFFECTIVELY BE ADDRESSED ON A REGIONAL BASIS, THERE ARE SOME THAT CAN ONLY BE ADDRESSED ON A NATIONAL BASIS (E.G. PRICE SUPPORTS). CONSEQUENTLY, ANY SUCH NATIONAL POLICIES AFFECTING THE PROGRAM IN AN IMPACT AREA SHOULD BE IDENTIFIED IN THEPP ALONG WITH THE RELEVANT RESOLUTION ON A NATIONAL BASIS.

5. INTERIM REPORT. THE INTERIM REPORT (IR) WAS APPROVED FOR A TOTAL POTENTIAL AID COMMITMENT OF 15.0 MILLION DOLLARS, SUBJECT TO AVAILABILITY OF FUNDS AND FEASIBILITY ANALYSIS, TO BE PHASED IN ACCORDANCE WITH THE READINESS OF AREA PLANS AND THE AREA PLANNING/COORDINATION MECHANISM. INTENSIVE REVIEW OF AN INITIAL PROJECT OF UP TO 7.0 MILLION DOLLARS WAS AUTHORIZED FOR SUBMISSION IN AUGUST. IN REVIEWING THE REPORT THE DAEC FOUND THAT LACK OF

DETAILED ANALYSIS AND PLANNING AS WELL AS AREA TARGET GROUP INFORMATION MADE IT IMPOSSIBLE TO JUDGE THE APPROPRIATENESS OF THE PROGRAM ACTIVITIES OR THEIR FEASIBILITY. IN ADDITION, INSUFFICIENT ATTENTION WAS BEING DEVOTED TO THE TOTAL COST OF THE PROGRAM. FINALLY, IT WAS NOT CLEAR WHETHER THE PROPOSED AREA PLANNING/COORDINATION MECHANISM TOOK INTO ACCOUNT THE EXISTING PROVINCIAL POLITICAL AND COORDINATION STRUCTURE. THE DAEC DID NOT BELIEVE THAT THE APPROPRIATE ANALYSIS COULD BE CONDUCTED FOR THE PROPOSED 5 IMPACT AREAS IN THE 4 MONTHS REMAINING OF THE FISCAL YEAR AND T. Q. CONSEQUENTLY, THE INITIAL PHASE OF THE PROJECT WAS LIMITED TO: (A) A PROGRAM FOR THE TONOSI AREA, (B) ESTABLISHMENT OF A PLANNING/COORDINATION MECHANISM, AND (C) DATA COLLECTION, ANALYSIS AND PLANNING FOR THE REMAINING IMPACT AREAS.

6. PLANNING. THE DAEC DID NOT AGREE WITH THE IR'S PROPOSITION THAT AREA DEVELOPMENT SHOULD BE PLANNED AS IT GOES FORWARD SINCE THE AREA PLANNING/COORDINATION UNIT IS UNTRIED. IN ADDITION, THE PROGRAM ACTIVITIES PROPOSED FOR TONOSI APPEARED TO BE A CATALOGING OF POSSIBLE ACTIVITIES FOR WHICH EACH MINISTRY OR AGENCY ALREADY HAD A PROGRAM UNDERWAY RATHER THAN THE RESULT OF A REGIONAL PLANNING EFFORT DESIGNED TO OVERCOME MAJOR TARGET GROUP PROBLEMS IN A SPECIFIC AREA. IN ORDER TO ESTABLISH BUDGETS, PERMIT JUDGEMENTS AS TO FEASIBILITY, AND MEET SECTION 611, DETAILED PLANNING IS REQUIRED. FOR EACH OF THE MAJOR COM-

COMPONENTS (E.G. PRODUCTION, EDUCATION, HEALTH, TRANSPORTATION, ETC.) THE MAJOR PROBLEMS SHOULD BE IDENTIFIED, THE COURSE OF ACTION TO RESOLVE THE PROBLEM SPECIFIED, AND THE ACTIVITIES TO BE UNDERTAKEN WITH THE APPROPRIATE BUDGET DESCRIBED. THIS SHOULD BE FOLLOWED WITH SUFFICIENT INSTITUTIONAL ANALYSIS TO ASSURE THAT THE RESPONSIBLE INSTITUTION KNOWS ITS ROLE AND CAN BE EXPECTED, GIVEN STAFF AND BUDGET, TO PERFORM EFFECTIVELY. FOR EXAMPLE, THE IR PROPOSES SOME 7.7 MILLION DOLLARS IN CREDIT FOR THE MAJOR PRODUCTION COMPONENT, YET NO INFORMATION IS PROVIDED TO INDICATE THAT CREDIT IS THE MAJOR PRODUCTION CONSTRAINT IN TONOSI, WHAT MIGHT BE REQUIRED BESIDES CREDIT TO INCREASE PRODUCTION NOR WHETHER A CREDIT INSTITUTION EXISTS IN THE AREA WHICH CAN DISPENSE CREDIT IN THAT AMOUNT.

IN ADDITION, ATTENTION WAS CALLED TO THE NEED TO IDENTIFY IN THE PROJECT DESIGN APPROPRIATE MEASURES OF CHANGES OF PRODUCTION, EMPLOYMENT, UTILIZATION OF PUBLIC SERVICES, ETC., WHICH ARE NECESSARY IN ORDER TO MAKE THE TRANSITION FROM THE PURPOSE (IMPROVEMENTS IN INSTITUTIONAL CAPABILITY AND CAPACITY) TO THE GOAL (IMPROVED QUALITY OF LIFE, INCREASED INCOME).

7. ECONOMIC FEASIBILITY. THE DAEC QUESTIONED THE OVERALL COSTS OF THE PROGRAM WHICH APPEARED EXTREMELY HIGH, I.E., 14.2 MILLION DOLLARS IN TONOSI TO INCREASE INCOMES OF 2,000 FAMILIES TO 1,500 DOLLARS (FROM AN UNKNOWN PRESENT FIGURE). CARE WILL HAVE TO BE EXERCISED IN THE PP IN DEFINING THE TARGET GROUP AND IN SEEKING THE LOWEST COST PROGRAMS ACTIVITIES. OVERALL COSTS AND BENEFITS OF THE PROGRAM SHOULD BE DISCUSSED IN THE PP.

A NATIONAL BUDGET ANALYSIS SHOULD BE INCLUDED DEMONSTRATING THAT THE GEOGRAPHIC AREA APPROACH CAN BE REPLICATED GIVEN THE EXPECTED GOP BUDGETARY LEVELS. IN ADDITION, THE BUDGET ANALYSIS SHOULD INDICATE THE EXTENT TO WHICH FUNDS ALLOCATED TO THE PROGRAM REPRESENT ADDITIONAL FUNDS OR SHIFTS IN

RESOURCE ALLOCATION. FINALLY, THE BUDGET ANALYSIS SHOULD IDENTIFY THE RECURRING COST IMPLICATIONS FOR THE NATIONAL BUDGET, E.G., ROAD, SCHOOL MAINTENANCE, ETC.

THE ECONOMIC FEASIBILITY OF EACH OF THE PRINCIPAL PROGRAM ACTIVITIES MUST BE DEMONSTRATED IN THE PP. FOR EXAMPLE: IF A CREDIT ACTIVITY IS PROPOSED, A MODEL FARM BUDGET ANALYSIS INDICATING ECONOMIC FEASIBILITY OF CREDIT TO THE INDIVIDUAL FARMER SHOULD BE INCLUDED. IF ACCESS ROAD ACTIVITY IS PROPOSED, A BENEFIT-COST ANALYSIS OF REPRESENTATIVE SAMPLES SHOULD BE PREPARED.

8. PLANNING/COORDINATION MECHANISM. THE DAEC AGREES THAT CONTINUOUS REPLANNING AND COORDINATION IN A PROJECT SUCH AS THIS IS INDISPENSABLE. THREE CONCERNS WERE RAISED WHICH SHOULD BE ADDRESSED BY THE PP. THE NATURE OF THE REGIONAL PLANNING FUNCTION SHOULD BE DESCRIBED. AT THE MOMENT IT APPEARS TO BE A COMPILATION OF GOVERNMENT AGENCY ACTIVITIES IN THE AREA RATHER THAN AN AREA ANALYSIS OF PROBLEMS AND A SERIES OF COURSES OF ACTIONS TO OVERCOME THOSE PROBLEMS. THE NEED FOR AUTHORITY OF THE COORDINATING UNIT OVER THE BUDGETARY RESOURCES OF THE EXECUTING AGENCIES SHOULD BE DISCUSSED. IF NOT OUTRIGHT CONTROL THEN WHAT OTHER MECHANISM (E.G. APPROVAL OF ANNUAL OPERATING PLANS, ETC.) IS NEEDED TO ASSURE TIMELY AND APPROPRIATE RESPONSE OF EXECUTING AGENCIES. THIRDLY, IT WAS NOT CLEAR THAT CONSIDERATION HAD BEEN GIVEN TO HOW THE NEW MECHANISM RELATED TO EXISTING POLITICAL (PROVINCIAL AND MUNICIPAL COUNCILS, ETC.) AND COORDINATING (HEALTH COMMITTEES, ETC.) STRUCTURES.

9. LIVESTOCK. THE DAEC QUESTIONED WHETHER MARGINAL FARMERS RAISED BEEF AND DAIRY CATTLE. THE PP SHOULD DEMONSTRATE THE ECONOMIC FEASIBILITY PARTICULARLY OF SMALL DAIRY OPERATIONS WHERE SIGNIFICANT INVESTMENT IN STERILE AND REFRIGERATED MILK HANDLING EQUIPMENT APPEARED NECESSARY.

10. IRRIGATION STUDY. GIVEN THE LARGE INVESTMENT ALREADY BEING CHANNLED INTO THE AREA, THE DAEC QUESTIONED THE DESIRABILITY OF CONDUCTING AN IRRIGATION STUDY WHICH WOULD FURTHER SIGNIFICANTLY INCREASE THE ALREADY HIGH DEVELOPMENT COST OF THE AREA. SUCH A STUDY SHOULD BE FINANCED ONLY IF THERE IS REASONABLE EXPECTATION THAT THE PROPOSED IRRIGATION PROJECT WILL BE FUNDED.

11. HEALTH. THE OBJECTIVES OF THE HEALTH COMPONENT SHOULD BE ESTABLISHED IN TERMS OF THE 2,200 FAMILY TARGET

GROUP AND THE COURSE OF ACTION SET OUT. THE COORDINATION OF THIS COMPONENT SHOULD BE DISCUSSED IN THE PP.

12. EDUCATION. THE OBJECTIVES OF THIS COMPONENT SHOULD BE ESTABLISHED IN TERMS OF THE TARGET GROUP AND THE PROPOSED COURSE OF ACTION SHOULD BE STATED. SPECIFICALLY, THE TARGET GROUP IS DESCRIBED AS HAVING A LOW EDUCATIONAL LEVEL, LIMITED SKILLS AND LOW LEVEL PRODUCTION TECHNOLOGY. (P.36) THE INTERIM REPORT STATES THAT FIELD TECHNICIANS MUST BE TRAINED AND MOTIVATED TO INTRODUCE NEW INNOVATIONS. THIS WOULD IMPLY THE NEED FOR SPECIALIZED TRAINING DIRECTED TOWARD THE ADULT TARGET GROUP APART FROM THE PRIMARY

EDUCATION PROPOSED IN THE IR. WHILE THE APPLIED AGRICULTURAL RESEARCH PRP STATES THAT THE IDIAP BY LAW WILL PROVIDE TRAINED COMMUNICATORS TO WORK WITH MIDA EXTENSION AGENTS BY GIVING FIELD DEMONSTRATIONS OF NEW TECHNOLOGIES, IT IS NOT CLEAR WHETHER THIS IN FACT WILL OCCUR OR WHETHER THERE WILL BE A TRAINING PROGRAM FOR EXTENSION TECHNICIANS. DOES THERE EXIST A SUFFICIENT QUANTITY OF TECHNICIANS OR IN FACT WILL TECHNICIANS HAVE TO BE TRAINED IN ORDER TO ACHIEVE PROJECT OUTPUTS? IN THIS REGARD IT IS IMPORTANT TO CONSIDER THE EFFECTIVENESS WITH WHICH THE TECHNICIANS COMMUNICATE WITH THE TARGET GROUP AS WELL AS WHETHER THERE ARE SUFFICIENT NUMBERS OF TECHNICIANS.

13. ENVIRONMENTAL IMPACT. THE REQUIREMENTS FOR AN ASSESSMENT OF THE EFFECTS OF AID PROJECTS ON THE ENVIRONMENT ARE CURRENTLY UNDERGOING CHANGES. THE NEW REQUIREMENTS, SENT FOR COMMENT TO THE MISSION VIA AIDTO 222, GO SUBSTANTIALLY BEYOND CURRENT REQUIREMENTS FOR AN ENVIRONMENTAL IMPACT STATEMENT. WE DO NOT EXPECT THAT THE NEW REQUIREMENTS WILL APPLY TO PROJECTS FUNDED IN THE TRANSITION QUARTER BUT THEY WILL APPLY TO FY 77 FUNDED PROJECTS. A FINAL DECISION ON THE EFFECTIVE DATE IS EXPECTED SHORTLY AND WILL BE COMMUNICATED TO MISSION IN SEPIEL.

14. MISCELLANEOUS. THE MISSION IS REMINDED THAT THE PP SHOULD INCLUDE (A) A DISCUSSION OF HOW THE PROJECT CAN BE EXPECTED TO FURTHER THE STATUS OF WOMEN, AND (B) THE USE OF THE FAR DISBURSEMENT METHOD TO THE EXTENT FEASIBLE. KISSINGER

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AID 1020-20 (11-73)  
SUPPLEMENT 1

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

Life of Project: From FY 78 to FY 83  
Total U.S. Funding \$9,700,000  
Date Prepared: 8/16/77

Project Title & Number: Integrated Rural Development - Tonosí

PAGE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The <del>Lead</del> objective to which this project contributes: (A-1)</p> <p><b>Goal:</b></p> <p>Improve incomes, employment and the quality of life of the rural poor in underdeveloped areas of the country.</p>	<p>Measures of Goal Achievement: (A-2)</p> <ol style="list-style-type: none"> <li>1. Substantial reduction in urban-rural income disparity and in rural unemployment/underemployment.</li> <li>2. Vital social services including health and education are within 2-3 hours walk for all inhabitants.</li> </ol>	<ol style="list-style-type: none"> <li>1. Census</li> <li>2. GOP records and census.</li> </ol>	<p>Assumptions for achieving goal targets: (A-4)</p> <ol style="list-style-type: none"> <li>1. Integrated rural development continues to be a priority area for the GOP.</li> <li>2. Sufficient financing from internal and external sources.</li> </ol>

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project: \_\_\_\_\_  
From FY 78 to FY 83  
Total U.S. Funding \$9,700,000  
Date Prepared: 8/16/77

Project Title & Number: Integrated Rural Development - Tonosí

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Purpose: (B-1)</p> <p>A. Establish an overall institutional capability for planning and implementing regional impact projects within the Government of Panama.</p> <p>B. Establish first integrated rural development program.</p>	<p>Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)</p> <p>A.1. An integrated rural development program secretariat (PRODIAR) capable of planning, budgeting, coordinating, monitoring and evaluating development activities in approximately 6 impact areas.</p> <p>2. Capability within MIDA for planning and implementing agricultural components of rural development projects.</p> <p>3. Technical Planning and Coordination Committee recommending projects to PRODIAR and assuming effective coordination of the inputs of the various government agencies at central and local level.</p> <p>4. High Level Commission approving projects and providing policy guidance and area selection.</p> <p>5. In Tonosí an integrated implementation mechanism providing or assuring land, water, TA, credit farm inputs and resource mgt. for the target population.</p> <p>B.1. Minimum net family incomes of about \$2,000 at 1976 prices equivalent to about \$400 per capita for most of the 1,000 target families.</p>	<p>A.1-5 Verification of these EOPs will be made through on-site inspections and GOP records.</p> <p>B.1-6. Verification will be through on-site inspections, review of GOP and project records such as farm credit plans and evaluation surveys.</p>	<p>Assumptions for achieving purpose: (B-4)</p> <p>A.1. High level personnel continue to devote sufficient time to the project.</p> <p>2. Inter-agency coordination develops as planned.</p> <p>B.1. Area Coordinator and other project officials able to motivate participants.</p> <p>2. Prices of agricultural inputs and outputs do not change in ways that are detrimental to the project.</p> <p>3. Climatic conditions remain favorable.</p>

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AID 1020-48 (1-75)  
SUPPLEMENT 1

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project: From FY 78 to FY 83  
Total U.S. Funding \$9,700,000  
Date Prepared: 8/16/77

Project Title & Number: Integrated Rural Development - Tonosí

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: (B-1)	<p>Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)</p> <ol style="list-style-type: none"> <li>2. All weather road network within a maximum of 2 hours by foot or horse for the entire population.</li> <li>3. An incremental value of ag. production at 1976 prices of \$4 million or about 90% increase over estimated 1976 level.</li> <li>4. Minimum of 1,500 hectares of hillside land reforested.</li> <li>5. Existence of a sound economic social and institutional basis for both broadening and deepening economic and social development of the district over subsequent 5 yrs.</li> </ol>		Assumptions for achieving purpose: (B-4)

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project:  
From FY 78 to FY 83  
Total U.S. Funding \$9,700,000  
Date Prepared: 8/16/77 PAGE 3

Project Title & Number: **Integrated Rural Development - Tonosí**

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Outputs: (C-1)</p> <p><b>A. Integrated Rural Development Administration.</b></p> <p>1. Key staff in PRODIAR and in MIDA's Directorate General of Sectorial Planning (DGPS) trained.</p> <p>2. National Geographic Institute upgraded.</p> <p>3. Processing and tabulation of area censuses completed on time.</p> <p>4. Cadastral and sociological surveys in new impact areas completed.</p> <p><b>B. Tonosí Area Project Dev.</b></p> <p>1. Field project staff trained and equipped.</p> <p>2. Initial and follow-up sociological surveys completed.</p> <p>3. Cadastral mapping completed and a property register established.</p> <p>4. Land redistributed participants resettled, and tenure/management models established.</p>	<p>Magnitude of Outputs: (C-2)</p> <p><b>A.1.</b> Approximately 10 people trained in areas such as spatial planning, implementation, evaluation and finance.</p> <p>2. Mapping equipment in place and operators trained.</p> <p>3. 6 censuses completed in time to complete project planning.</p> <p>4. Surveys completed in 6 areas in time for project planning and/or implementation.</p> <p><b>B.1.</b> 20 people trained, offices constructed and vehicles and other equipment procured.</p> <p>2. Initial and follow-up surveys completed in years 1, 2 and 5.</p> <p>3. Mapping of the area completed and a property register set up.</p> <p>4. Approximately 10,000 hectares of land redistributed and 900-1000 farm families resettled in technically and socially sound modes.</p> <p>5. Adequate technological packages and management practices developed for all planned lines of production.</p> <p>6. Fund established, client credit plans developed and Area Credit Committee established.</p>	<p>Verification will be made by viewing GOP, project and Mission records and carrying out on-site inspections in conjunction with annual project evaluations</p>	<p>Assumptions for achieving outputs: (C-4)</p> <p><b>A &amp; B. 1.</b> Personnel with adequate basic skills are available for training and to fill PRODIAR and DGPS positions</p> <p>2. Counterpart funding is made available as planned.</p> <p>3. General rate of inflation does not exceed forecasts.</p> <p>4. Funding from other loans is not withdrawn from the project.</p>

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WORLD BANK  
SUPPLEMENT 1

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project: From FY 78 to FY 83  
Total U.S. Funding \$9,700,000  
Date Prepared: 8/16/77 PAGE 3

Project Title & Number: Integrated Rural Development - Tonosí

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Project Outputs: (C-1)</p> <ol style="list-style-type: none"> <li>5. Design and implement applied research and technological transfer programs.</li> <li>6. Rotating credit fund established in BDA along with necessary mechanism for granting credit.</li> <li>7. Credit insurance reserve created.</li> <li>8. Machinery pool established.</li> <li>9. Storage facilities constructed.</li> <li>10. Road improvements.</li> <li>11. Watershed management.</li> <li>12. Reforestation.</li> <li>13. Forest conservation.</li> </ol> <p>C. Outputs dependent on other loans.</p> <ol style="list-style-type: none"> <li>1. Health</li> <li>2. Housing</li> <li>3. Education</li> <li>4. Roads</li> </ol> <p><u>Inputs</u> - See financial plan for details on funding.</p>	<p>Magnitude of Outputs: (C-2)</p> <ol style="list-style-type: none"> <li>7. Insurance Reserve established.</li> <li>8. Machinery pool equipped, staffed and maintaining equipment.</li> <li>9. 2 onion drying and storage modules, a tempering bin and drier for rice and 3 bagged storage bins constructed.</li> <li>10. Approximately 12 road segments totalling about 80 km upgraded.</li> <li>11. Hydrology study and soils inventory completed and about 70 km of streambeds cleaned.</li> <li>12. Tree nursery established.</li> <li>13. Slash and burn practices virtually eliminated.</li> </ol> <p>C.1. 4 aqueducts, 5 deep wells and 720 latrines constructed and an expanded vaccination program implemented.</p> <ol style="list-style-type: none"> <li>2. 300 housing units constructed.</li> <li>3. Basic Cycle Production School expanded.</li> <li>4. 25 km paved road from Tonosí to Guánico area constructed.</li> </ol>		<p>Assumptions for achieving outputs: (C-4)</p>

INTEGRATED RURAL DEVELOPMENT

PROJECT PERT ACTIVITIES

Phase I

<u>No.</u>	<u>Description and Completion Date</u>	<u>Action</u>
0	Starting Point (PP prepared and submitted to AID/W) (19 Aug. 77)	AID/P
0-1	Obtain AID/W approval. (1 Sept. 77)	AID/P
1-2	Prepare and sign a Project Agreement (Sept. 77)	AID/P-GOP
0-3	Complete Conditions Precedent and submit proof thereof. (1 Oct. 77)	GOP-PRODIAR
3-3a.	Formally appoint Tonosf Area Coordinator and initial key staff and assure adequate operating funds and facilities. (1 Oct. 77)	MIDA-PRODIAR
3-3b	Design detailed first year operational plan. (15 Oct. 77)	MIDA-Coordinator PRODIAR-AID
3-11a	Contract orthophotographic mapping of aerial photograph of Tonosf. (15 Oct. 77)	National Geo- graphic Inst. -GOP
3-11	Contract for the Regional Staff Bureau of Census DEC in Washington to process data provided by "Contraloría General", Department of Statistics and Census. With that information tabulate and analyze the 1977 area census. (30 October 77)	AID - Contraloría General
3-4	Determine all personnel requirements for PRODIAR and MIDA at Central level (National personnel and of all long and some short term foreign technicians) to perform activities as per the scheduled detail plan. (30 Oct. 77)	MIDA-Coordinator PRODIAR-AID
3-5	Prepare all procurement orders for all necessary program and project administration commodities such as vehicles, furniture, office equipment, and other. (30 Oct. 77)	Coordinator- MIDA PRODIAR-AID

<u>No.</u>	<u>Description and Completion Date</u>	<u>Action</u>
2-34	Identify, determine eligibility, and contract for the supervision and construction of 40% of the roads (Oct. 77) and initiate construction. (30 Nov. 77)	MOP
2-35	Locate river beds-to be cleared, make a plan of action and start cleaning operations. (31 Dec. 77)	MOP
2-36	Select, motivate and train forest supervisors and forest guards. (31 Dec. 77)	RENARE
4-6	Select and contract first group of long and short term foreign technical advisors to assist MIDA, PRODIAR, and field personnel in their initial activities. (30 Dec. 77)	MIDA-Coordinator PRODIAR-AID
4-7	Select national technical personnel to reinforce IRD unit in MIDA and arrange for their transfer. (30 Dec. 77)	MIDA - Coordinator
3-9	Determine project staff facilities to provide adequate office space and living quarters for the project staff. Also prepare designs and contract for supervision and construction of same. (31 Dec. 77)	MIDA
3-10	Design an administrative system capable of coordinating the activities of all participating agencies, through a general Area Coordinator. (31 Dec. 77)	MIDA- Coordinator BDA-Contractor
2-28	Design an evaluating, monitoring and retrieval system to be incorporated as a permanent activity of the project for updating implementing methodologies and implementation plan. (Dec.77)	Monitor/PRODIAR MIDA/Contractors
3-11b	Complete orthographic mapping and establish ground control. (15 Jan. 78)	National Geo- graphic Inst. - Coordinator
3-8	Based on needs, design training programs and materials for MIDA and PRODIAR personnel and determine sites for training activities. (31 Jan. 78)	MIDA- Coordinator PRODIAR

<u>No.</u>	<u>Description and Completion Date</u>	<u>Action</u>
11-12	Adequate socio-psychological sample survey to serve as baseline. (31 Jan. 78)	MPPE
11a-12b	Based on orthophotographic map prepare cadastral map. (28 Feb. 78)	Nat'l Geographic Inst./ Coordinator
10-13	Determine total personnel needs of Tonosf and recruit them. (30 Mar. 78)	Coordinator/ MIDA/PRODIAR Partic. Agencies
7-14	Select and recruit additional personnel not available within MIDA. (30 Apr. 78)	MIDA
10-15	Promote projects establishing close contact with participating community, holding information meeting with local groups, Mayor and township representatives, and gather pertinent information for future system design use. (30 Apr. 78)	MIDA-Coordinator
5-16	Monitor procurement and receipt of purchased commodities and, as necessary, their delivery to sites. (31 May 78)	PRODIAR-AID MIDA-Coordinator
12a-17	Based on updated cadastral mapping of part of the area, complete a register of cadastral parcels according to their capability, utilization and legal tenure status. (31 May 78)	National Geographic Inst. MIDA-PRODIAR
12-18	Soil survey of selected areas, to sub-classify land subject to redistribution and determine basis for campesinos' willingness or reluctance to resettle. (31 May 78)	RENARE/MIDA
11-19	Complete integration of census data segments with the cadastral mapping and soil survey to update the available information regarding potential land use and population shifts in micro-areas required for implementing comprehensive land reform in Tonosf. (30 June 78)	PRODIAR/MIDA RENARE

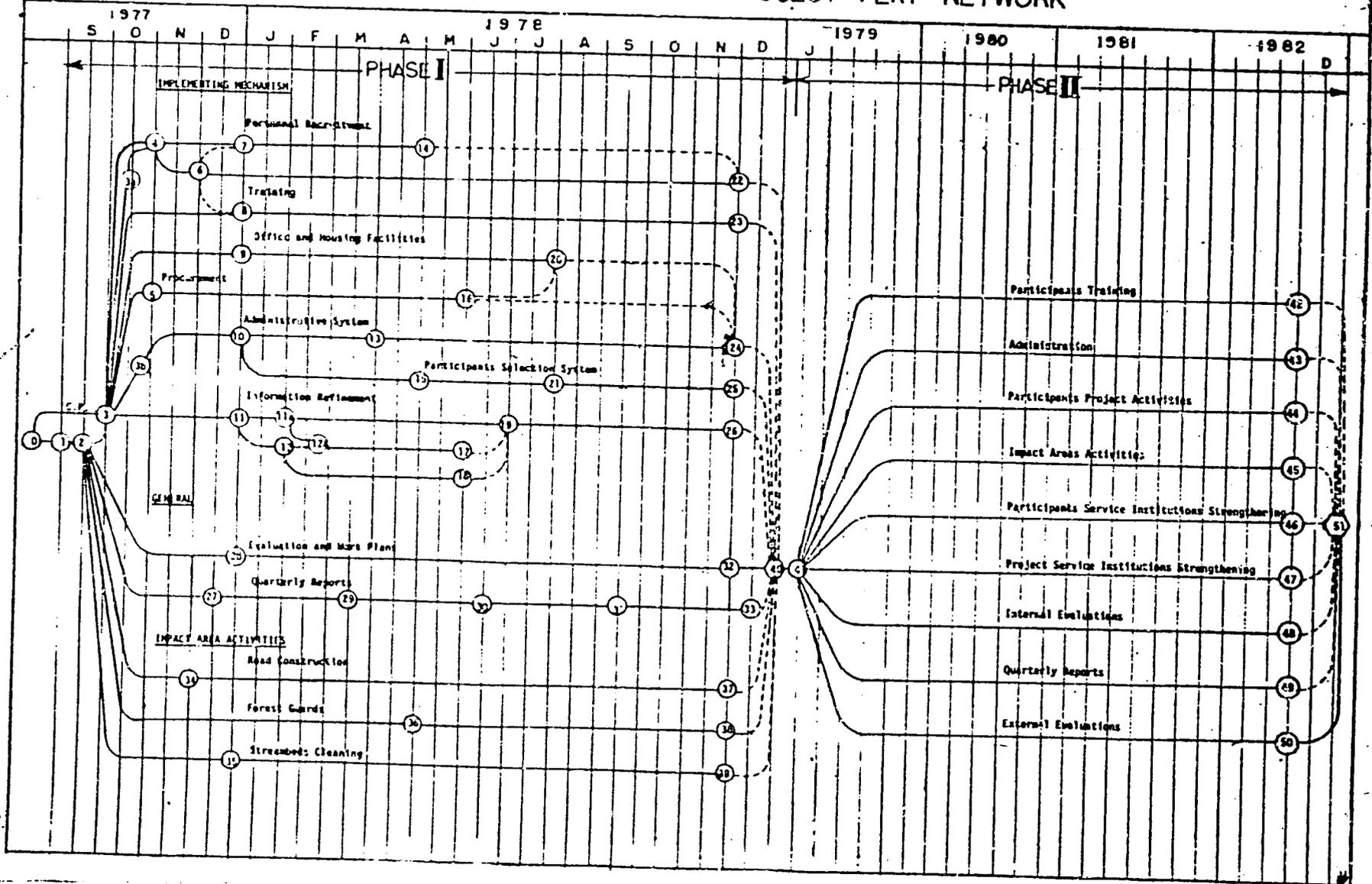
<u>No.</u>	<u>Description and Completion Date</u>	<u>Action</u>
34-37	Complete construction of all roads schedule within Phase I. (30 June 78)	MOP
9-20	Construct required offices and housing facilities and equip them as necessary. (31 July 78)	Coordinator MIDA - Contractors
15-21	Based on the data and analysis obtained in the information requirement activities, design a method to select participants and to match them with land resources. (31 July 78)	PRODIAR-MIDA AID
6-22	Continue selecting and contracting short-term advisors to fulfill requirements according to established T.A. schedule and training. (30 Nov. 78)	Coordinator- MIDA PRODIAR-AID
28-32	Conduct internal evaluation of each intervention and through a feed-back system improve as necessary, implementation plan activities. Also prepare a detail work plan for the implementation phase, with year two details. (30 Nov. 78)	Monitor/MIDA PRODIAR
37-40	Identify, determine eligibility, and contract for supervision and construction of balance (60%) of roads and initiate construction. (Start 31 Oct. 78. Finish 30 Nov. 78)	MOP
36-38	Integrate as a permanent activity the training of forest supervisors and guards, including educational efforts to make the area population aware of tree and forest importance. (30 Nov. 78)	RENARE
35-39	Complete cleaning river beds scheduled for Phase I. (30 Nov. 78)	Coordinator- MIDA
8-23	Conduct first phase training activities and on the job T.A. to develop national personnel from MIDA/PRODIAR, AREA COORDINATOR and AREA TECHNICIANS. (30 Nov. 78)	MIDA/ Contractors

<u>No.</u>	<u>Description and Completion Date</u>	<u>Action</u>
13-24	Test and update as necessary the administrative system. (30 Nov. 78)	Coordinator/ PRODIAR MIDA/Contractors
20-25	Select the participants in the project, size and location of their land parcels and aspirations regarding type of management and farming. (30 Nov. 78)	Coordinator
19-26	Continue updating pertinent information as a permanent activity of the system in order to base decisions on correct information. (30 Nov. 78)	Coordinator- MIDA-IDIAP
2-27 27-29 29-30 30-31 31-33	Prepare and submit to AID a quarterly progress report. (15 Dec. 77) (15 Mar. 78) (15 June 78) (15 Sept. 78) (15 Dec. 78)	Monitor/ PRODIAR
13-24	Determine and finalize production/credit plan for 1979. (15 Dec. 78)	Coordinator- MIDA BDA-AID
32-40	Conduct first yearly general external evaluation of the project and submit recommendation for improving project performance activities. (31 Dec. 78)	AID
<u>PHASE II</u>		
40-41	Incorporate into the second phase work plan all recommendation submitted by the external evaluation. (15 Jan. 79)	PRODIAR/MIDA
40-45	Complete construction of all roads. (30 June 79)	MOP
40-42	Continue training personnel at all levels as a permanent activity of the project, including seminars, conferences, courses, observation trips and on-the-job training. (3 Nov. 82)	MIDA-Contractors Participating Organizations

<u>No.</u>	<u>Description and Completion Date</u>	<u>Action</u>
41-43	Continue administering the programs and updating the administrative system insuring proper controls and communication to all agencies and at all levels. (30 Nov. 82)	Coordinator/ MIDA/PRODIAR
41-44	Continue selecting and forming work units within the targeted group, insuring that project participants obtain all necessary inputs in a timely manner. (30 Nov. 82)	Coordinator/ MIDA
41-45	Continue implementing area activities within the program as road maintenance, forestry improvement and protection; streambed cleaning; storage facilities development; etc. (30 Nov. 82)	MOP/MIDA
41-48	Continue strengthening and insuring backup services to targeted population from service institutions in areas of marketing, provision of machinery and equipment, seeds and fertilizers, training and technical assistance; and credit. (30 Nov. 82)	Coordinator/ PRODIAR/ Participating Organisms
41-49	Continue strengthening and insuring backup services to the project from institutions fulfilling activities in reforestation; cadastral surveys and land redistribution.	PRODIAR/MIDA Participating Organisms
41-50	Continue conducting internal evaluations and updating intervention methodologies and systems. (30 Nov. 82)	Coordinator/ MIDA/PRODIAR
41-51	Continue submitting quarterly progress reports. (30 Nov. 82)	Coordinator
41-51	Continue conducting yearly external evaluations submitting recommendations for improving project performance activities. (30 Nov. 82)	AID
50-51	Final evaluation and end of project report. (31 Dec. 82)	AID

ANNEX I - E  
Figure 1

# INTEGRATED RURAL DEVELOPMENT PROJECT PERT NETWORK



DRAFT PROJECT DESCRIPTION

The \$9.7 million AID loan and \$9.9 million GOP counterpart will finance a major initiative on the part of the Government of Panama to implement an integrated rural development strategy. The purpose of the project is two-fold; first, at the institutional level, to help the Government establish an overall capability for the planning and implementation of rural development projects with regional impact, and second, to help implement a program for the accelerated development of the Tonosí impact area. The project will finance activities at both the central and impact area levels in trying to achieve this dual purpose.

At the central level the Program for Integral Development of Rural Areas (PRODIAR) in the Ministry of Planning will receive training and technical assistance in planning and implementing rural development projects. PRODIAR will receive project recommendations from the Technical Planning and Coordinating Committee (composed of the Directors of Planning of each Ministry and decentralized institution). This Committee will assure maximum integration and complementarity of human, economic, financial and natural resources required.

A High Level Commission, composed of the Ministers or Vice Ministers of each Ministry that participates in the integrated rural development program (Agriculture, Health, Education, Public Works, Commerce and Industry, Planning, and Housing) and of the Directors of the decentralized institutions such as the National Institutes of Water Resources and Electricity (IRHE) and of Aqueducts and Sewerage (IDAAN), will approve project selection, establish policies, objectives, strategies and goals at the national level, based upon PRODIAR recommendations, and oversee their achievement as monitored by PRODIAR.

Actual implementation of the projects approved will be the primary responsibility of the Ministry of Agriculture (MIDA). Because of MIDA's role, key staff in the Directorate General for Sectorial Planning will receive training and technical assistance in project planning, analysis and evaluation methodology and other technical fields. This key staff will provide technical backstop to the work done in the field, and, specifically to the field project coordinator (Area Coordinator) who will be located in the project area (Tonosí). The Coordinator will have overall responsibility for project implementation, and will be responsible to the Director General of Sectorial Planning of MIDA.

At the field level, a number of activities are planned to achieve the purposes of implementing a program for the accelerated development of the Tonosí area. The Area Coordinator will be assisted by a

project team to be located in Tonosí and a loan financed long-term advisor knowledgeable in the principal fields concerned and experienced in managing land-reform based rural development. The project team will be composed of technical staff in the areas of crop and livestock development, farm management, cooperative organization and credit planning. This team will implement a multi-faceted program directed towards approximately 1000 target families. The activities from which these target families will benefit, and the agencies that will assist in implementing them (under the supervision of, and with technical assistance from the Area Coordinator and Project Team), are discussed below.

1. Land Redistribution: Approximately 10,000 hectares of land are estimated to be required for settling or resettling the 1000 project participant families, including about 2000 - 3000 hectares of cropland and about 7,000 hectares of grazing land. The distribution and titling process will be the responsibility of the Directorate General of Agrarian Reform (DGRA) in MIDA and financed by the GOP. Land use patterns (i.e., crop production, dairy operations, reforestation) will be changed to reflect land capabilities and efficient resource use.

2. Agricultural Production: The production program estimates a participation of about 900 families out of the potential target group of 1000. Of these, 650 are expected to be growing crops (from among rice, corn, sorghum, cowpeas, cassava, yams, sugar cane, plantains, tomatoes, and/or onions) while 250 will be dairy farmers who will also sell surplus calves and cull cows. The project will finance all inputs needed by the participants:

- The Agricultural Research Institute (IDIAP) and MIDA will conduct soil and water studies on the land subject to redistribution to determine optimum land use, crop mixes and technological packages.

- A special rotating credit fund - financed in part by the loan - will be established in the Agricultural Development Bank (BDA) to fully finance fixed investment, production credit, and other working capital needs of the project participants.

- While the credit fund will be used to finance small-scale farm machinery needed by individuals or groups, the loan will finance the purchase of heavy farm equipment (e.g., tractors) for the Tonosí area. A machinery pool will be established and fully staffed in Tonosí, and managed by MIDA's machinery service, the "Empresa Nacional de Maquinaria" (ENAMA).

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- A drying and storage facility to handle increased onion production from the area will be constructed and a dryer and tempering bin for rice will be installed, both with loan funds.
- Other needed production inputs - e.g., seed, fertilizer, agricultural chemicals, etc. - will be supplied through the Federation of Agricultural Cooperatives (COAGRO) using credit from the BDA.
- Dairy cows and bulls will be purchased, again using the BDA credit fund, from existing herds in the country.

Technical assistance for project participants in all of these areas will be assured by the resident staff of the Area Coordinator (with advice from the long-term advisor and short term external technical assistance), supplemented, to the extent required, by technical staff of MIDA's and other agricultural agencies' regional and central staffs.

3. Road Improvement: In order to improve accessibility and facilitate marketing, the National Directorate of Construction (DNC) of the Ministry of Public Works (MOP) will direct the upgrading of approximately 12 dirt road sections (totalling about 80 kilometers) to all-weather gravel surfaced roads. Road maintenance will be provided by the Municipality. The loan will provide all road improvement costs and part of the additional maintenance equipment to supplement the Municipio's capabilities.

4. Watershed Management and Reforestation: To fully meet the objective of more rational land use, the project will finance a program of watershed management and reforestation. Technical responsibility for this program will be in the Directorate General of Natural Resources (RENARE) of MIDA. RENARE will have a small cadre of professional and technical personnel in Tonosí, under the overall direction of the Area Coordinator, to administer the following component activities which will be partially financed by the loan:

- A forest conservation program will be initiated and local personnel will be trained as forest guards responsible for fire prevention and control. Some equipment will be procured.
- Approximately 1500 hectares of the most severely degraded land will be reforested with fast growing species well-suited to the area.

- A soil and water management conservation program will be implemented to improve the water balance within the watershed. Specific activities to be financed include: (a) a hydrologic study to provide information that will permit planning for future water resource use, (b) a soils inventory to facilitate longer-term land use planning, and (c) streambed clearing to reduce severe flooding.

5. Pilot Projects: The loan will finance experimental pilot projects identified by the area project team as activities that efficiently utilize the area's resources and are potential sources of additional income for project participants. Examples include: (a) farm pond fish production, (b) manufacture/marketing of charcoal, and (c) a portable sawmill for lumber.

DRAFT LOAN AUTHORIZATION  
AID LOAN No. 525-T-046

For: PANAMA - Integrated Rural Development

Provided from: Section 103 Food and Nutrition

Pursuant to the authority vested in the Administrator, Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961 as amended, ("The Act") and the delegations of authority issued thereunder, I hereby authorize the establishment of a Loan ("Loan") pursuant to Section 103 of the Act to the Government of Panama ("Borrower") of not to exceed nine million seven hundred thousand United States Dollars (\$9,700,000) to assist in financing the United States dollar and local costs of a project to establish a capability for planning and implementing integrated rural development projects with regional impact and to help implement such a program in the first of the priority regional areas ("Project"). The Loan shall be subject to the following terms and conditions:

1. Interest and Terms of Repayment

Borrower shall repay this Loan to A.I.D. in United States dollars within twenty (20) years of the date of the first disbursement under the Loan, including a grace period of not to exceed seven (7) years. Borrower shall pay to A.I.D. in United States dollars interest at the rate of two percent (2%) per annum during the grace period and three percent (3%) per annum thereafter on the outstanding undisbursed balance of the Loan and unpaid interest.

2. Other Terms and Conditions

- a. Except for ocean shipping, goods and services financed under the Loan shall have their source and origin in Panama or countries included in A.I.D. Geographic Code 941, provided, however, that marine insurance may be financed under the Loan only if it is obtained on a competitive

basis, and any claims thereunder are payable in freely convertible currencies. Ocean shipping financed under the Loan shall be on flag carriers of the United States or Panama.

- b. Upon Loan Agreement signing, A.I.D. may disburse Loan funds for the following activities provided that contracts or agreements for such activities were entered into subsequent to Loan Authorization:
  - (i) Tabulation of census data.
  - (ii) Cadastral laboratory work including orthophotographic mapping.
- c. Except as provided above and unless otherwise agreed in writing by A.I.D., prior to the issuance of any commitment documents or any disbursements under the Loan, Borrower shall furnish to A.I.D. in form and substance satisfactory to A.I.D.:
  - (i) An opinion of the Procurador General of Panama that the Agreement has been duly authorized and/or ratified and executed on behalf the Government of Panama and that it constitutes a valid and legally binding obligation of the Government of Panama in accordance with all of its terms.
  - (ii) A statement of the names of the persons representing or acting as representatives of the Government of Panama for purposes of the Loan and a specimen signature of each person specified in such statement.
  - (iii) Evidence that the High Level Commission and its Secretariat have been legally established and the members appointed.
  - (iv) Evidence that the Technical Planning and Coordinating Committee has been legally established and its members appointed.

- (v) Evidence that the High Level Commission has appointed a full-time Field Project Area Coordinator and the staff of the Coordinators Office with authority and responsibility for coordinating and implementing all aspects of the Project.
- d. Except as otherwise agreed in writing by A.I.D., prior to the issuance of any commitment documents or disbursements under the Loan for financing the credit needs of Project participants, Borrower shall furnish to A.I.D. in form and substance satisfactory to A.I.D.:
  - (i) Evidence that the Area Consultative Committee in the Tonosí District has been legally established and its members appointed.
  - (ii) Evidence of the redistribution of land and resettlement of Project participants consistent with efficient resource utilization sufficient for at least the first year of credit operations.
  - (iii) Evidence of the establishment of a rotating credit fund with appropriate operating regulations within the Agricultural Development Bank (BDA) with sufficient funds to initiate credit operations in accordance with the implementation plan.
  - (iv) Evidence that the technical staff required for credit operations by the implementation plan have been located in the project area.
- e. Except as otherwise agreed in writing by A.I.D., prior to the issuance of any commitment documents or any disbursement under the loan for financing farm machinery, Borrower shall furnish to A.I.D. in form and substance satisfactory to A.I.D. a plan for the creation of a farm machinery pool which includes the management and maintenance of the equipment.

- f. Except as otherwise agreed in writing by A.I.D., prior to the issuance of any commitment documents or any disbursements under the Loan for financing any particular road segment, Borrower shall furnish to A.I.D. in form and substance satisfactory to A.I.D. evidence that the segment meets selection criteria. Established in the Loan Agreement.
- g. Except as otherwise agreed in writing by A.I.D., prior to the issuance of any commitment documents or any disbursements under the Loan for financing vertical construction (e.g., buildings, storage facilities), Borrower shall obtain A.I.D. approval in writing.
- h. Borrower covenants that during the first year of the Project, an implementation plan will be developed which describes in detail the activities to be undertaken and responsibilities for the execution thereof during the remaining four years of the Project.
- i. Borrower covenants to conduct annual evaluations of the Project with A.I.D. during disbursement of the Loan.

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6C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights? YES
  
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? No. The Government of Panama is actively cooperating with U.S. and international agencies in the control of illicit drugs and narcotics traffic.
  
3. FAA Sec. 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba? Panama does not furnish assistance to Cuba. Panamanian flag carriers do carry cargo to and from Cuba. A Secretarial Determination was signed on 6/30/75 waiving the application of this section.
  
4. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement? Yes, it has been so determined.
  
5. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government? The GOP is not known to be indebted under any of these circumstances to any U.S. citizen for goods and services furnished or ordered.
  
6. FAA Sec. 620(e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? NO

- A
7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos? NO
8. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? NO
9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? Adequate measures have been taken to protect U.S. property.
10. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? U.S. - Panama agreement relating to investment guarantees entered into force March 8, 1962.
11. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters, One vessel was seized in early 1974.
- a. has any deduction required by Fishermen's Protective Act been made? NO
- b. has complete denial of assistance been considered by AID Administrator? Such a denial was considered by A.I.D. Administrator and deemed in the U.S. interest.
12. FAA Sec. 620(u); App. Sec. 504. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default? (a) NO  
(b) NO
13. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).) Less than 1% of 1976 budget was for military expenses. Less than 1% of 1976 foreign exchange resources expended on military equipment. No sophisticated weapons systems have been purchased by GOP.

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- A 14. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? NO
- 15. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? NO
- 16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? NO
- 17. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? NO
- 18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.? NO
- 19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate? NO

Panama is not delinquent with respect to dues, assessments, or other obligations to the U.N. for the purposes of Article 19 of the Charter.

6. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

- a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment. YES

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 233; 211(a)(4), (7). Describe extent to which country is:

- (1) Making appropriate efforts to increase food production and improve means for food storage and distribution.
- (2) Creating a favorable climate for foreign and domestic private enterprise and investment.

The GOP is implementing a broad range of agricultural programs, including farm credit, land development & resettlement schemes, & improved food distribution and storage.

Panama's Banking Law of 1970, the use of the U.S. Dollar as legal tender, and the complete freedom of international payments and exchange transactions combine to create a favorable climate for private enterprise

- (3) Increasing the public's role in the developmental process.

The GOP continues to encourage grass roots participation in the development process. For example, it has strengthened local gov't involvement in determining national priorities, policies, & programs; encouraged local initiative thru the establishment of community committees in health & education; and actively promoted the development of cooperatives.

- (4) (a) Allocating available budgetary resources to development.

In 1975, gross domestic capital formation was 28.0% of GDP (using constant 1960 prices). The Nat. Gov'ts investment budget for 1976 totaled \$360 Mil. or 53% of the GOP's budget. Panama's military expenditure continue to represent a small percentage of the national budget. Panama has not intervened in the affairs of other free and independent nation.

- (b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.

- (5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

In recent years GOP has effected tax reforms to significantly increase public revenues; provided public land for group farming schemes; and has attempted to maintain an open dialogue with the private sector.

- (6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

The Government is clearly responding in an effective manner to the development needs of its people, particularly in the areas of agriculture, health, education, and housing. This Project will strengthen the GOP's equity oriented programs.

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- c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made? YES
- d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs? NO
2. Security Supporting Assistance Country Criteria N/A
- a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section? N/A
- b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance? N/A
- c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? N/A

6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds; and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)

(a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project;  
 (b) Is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure plus 10%)?

The loan was included in A.I.D. FY 77 Congressional Presentation.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

YES

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit timely accomplishment of purpose of the assistance?

No further legislative action is required to accomplish the loan's purpose.

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

Not applicable.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

YES

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A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multi-lateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multi-lateral organizations or plans to the maximum extent appropriate?

This project cannot be executed as part of an international regional project. Although the project is not designed with a view to promoting regional development programs, it may well serve as a model in other developing countries.  
Panama is not a newly independent country.

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

- a) It is not envisioned that this loan project will have any appreciable impact on the flow of international trade.
- b) The loan will foster small farmer activity and small agro-industry.
- c) The development and use of cooperatives and credit unions will be encouraged.
- d) The loan project will tend to discourage monopolistic practice.
- e) Yes, especially of agriculture.
- f) It is not envisioned that this loan project will have any appreciable impact on strengthening free labor unions.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

It is anticipated that a portion of the technical assistance and most of the equipment for the project will be procured from U.S. private sector sources.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

Not applicable. The currency used in Panama is the U.S. Dollar although it is denominated a "Balboa". There is no U.S. owned "local currency".

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

Not applicable.

**B. FUNDING CRITERIA FOR PROJECT**

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage development.

The project is being designed to mobilize maximum participation of the target group in planning and implementation through grass-roots organization and through the existing local government and community organization structure.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

The basic purpose of the loan is to improve the quality of life of the rural poor providing increased income and employment opportunities, with emphasis on agricultural production and incorporation of remote but potentially productive rural areas into the political, social and economic life of Panama.

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

N/A

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

N/A

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

N/A

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

N/A

(b) to help alleviate energy problem;

N/A

(c) research into, and evaluation of, economic development processes and techniques;

N/A

(d) reconstruction after natural or manmade disaster;

N/A

(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

N/A

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

N/A

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(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

N/A

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

The Ministry of Planning and Economic Policy has agreed to provide a counter-part contribution in excess of 25% of total project cost.

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

NO

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on: (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

This loan is designed to raise the incomes of the poorest strata and improve general levels of living in remote rural areas which have been stagnant for decades, offering employment and income generating opportunities which will raise the levels of living of inhabitants; providing a transition from subsistence production to a market economy in these specific areas. Health and education resources will need to be reinforced thereby improving health and education levels in these rural poverty areas.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

Appropriate mechanisms are being created which will coordinate the major sectoral activities of the public sector within specific areas, and at the same time assure the participation of the beneficiary population in overall decision-making, as well as in specific project identification, planning, implementation and evaluation. Felt needs will be identified and education and training activities will address these needs.

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g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

2. Development Assistance Project Criteria (Loans only)

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

It does by providing access roads, farm credit, technical assistance and on-farm investments for increasing agricultural production in these remote areas. This project is designated to further strengthen the Rural Cooperative Development, the Grains and Perishables Market, the health and education systems. It will sharply increase farm output and raise economic and social living levels of the rural poor. The PP provides such information.

This project will have no foreseeable adverse effects on the U.S. economy in areas of labor surplus. Assistance will be furnished in a manner consistent with improving the U.S. balance of payments position.

Financing for this activity from alternative sources is not available.

There are reasonable prospects of repayment.

The terms are both reasonable and consistent under the applicable U.S. and Panamanian laws.

The Borrower has made an application for loan financed assistance in this activity and there have been assurances that funds will be used in an economically and technically sound manner.

Yes. The project is being designed to mobilize maximum participation of the target group in planning and implementation through grass-roots organization and through the existing local government and community organization structure.

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e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

Loan proceeds will be used to procure goods and services primarily from private sources.

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

Not applicable.

3. Project Criteria Solely for Security Supporting Assistance

Not applicable.

. FAA Sec. 531. How will this assistance support promote economic or political stability?

4. Additional Criteria for Alliance for Progress

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

YES. The project will result in integration of a section of Panama into the mainstream of Panamanian economic and political life and will serve as a model for replication in other areas both within Panama and in other LA countries.

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

YES

6C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not):

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?
 

Standard procedures will be followed to facilitate small business participation in AID financed procurement.
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?
 

Loan funded commodity procurement will be limited to Panama, the United States and other AID Geographic Code 941 countries.
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?
 

YES
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?
 

Not applicable.
5. FAA Sec. 609(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?
 

Yes, the Loan Agreement will so stipulate.
6. MMA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.
 

The Loan Agreement will require compliance with this provision.
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,
 

Loan financed technical assistance will be furnished primarily from private sources on a contract basis.

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are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air-Transport. Fair Competitive Practices Act, 1974

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

No grant assistance is contemplated. If such assistance is given the cited act will be complied with.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

Services of U.S. professional firms will be utilized to the maximum extent practicable.

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Yes. Panamanian law so requires and the project agreement will require it.

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million?

Not applicable.

C. Other Restrictions

1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

YES

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

Not applicable.

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the U.S.?

Yes, the Project Agreement will so specify and the borrower is aware of the restriction.

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction?

No non-U.S. manufactured motor vehicle will be so financed under the loan.

5. Will arrangements preclude use of financing:
- a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions? YES
  - b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? YES
  - c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? YES
  - d. FAA Sec. 662. for CIA activities? YES
  - e. App. Sec. 103. to pay pensions, etc., for military personnel? YES
  - f. App. Sec. 106. to pay U.N. assessments? YES
  - g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). YES
  - h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? YES

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ECONOMIC AND FINANCIAL DATA

A. ECONOMIC ANALYSIS

1. Summary

The project's economic viability has been evaluated and affirmed from three different viewpoints. First, the average small farmer/rancher participants' family incomes are expected to increase from less than \$1000 to \$2000 annually as a result of successful project implementation. Secondly, sub-project area analyses demonstrate that enough suitable land is available for resettlement purposes to justify construction of the roads needed to settle all project participants. Thirdly, the entire project is expected to have an internal rate of return of 18 percent. Thus, achievement of a minimum \$400 per capita income target for project participants represents a rational means for advancing a key government development goal of narrowing the wide metropolitan - hinterland income gap.

2. Farm Level Analysis

a. Pre-project farm income. (Tables 1a-c) <sup>1/</sup>

The calculation of pre-project income was based on data from the 1971 Census of Agriculture. The value of production on target family crop farms in 1971 was adjusted upward by 6 percent annually to reflect 1976 farm-gate prices in Tonosi. It is assumed there was no increase in the volume of per capita production on target family farms. Similarly, the calculation of income from pre-project cattle (dairy/beef) farms is based on the average coefficients of production, i.e., weight gain, milk production, birth rate, carrying capacity, etc., in Tonosi (as revealed by Census data) and valued at 1976 prices.

Average estimated pre-project family income of 912 households of small farmers (less than 10 hectares - Model A) and of landless laborers was approximately \$900 per family in 1976, (Table 1a). (Landless families were included in this income group on the assumption that their incomes are no more than that of the small farm families). Among the above group are about 100 families with cattle who are estimated to earn about \$1000 per family. Median Farm B reflects the cattle income earned by another 130 families with fewer than 9 cattle on farms of between 10 and 99 hectares, (Table 1b). Since it appears that these 130 families are located on marginal land and grow some subsistence crops, their total family income would be very similar to that of Median Farm B. The third pre-project farm model (Model C, Table 1c) is a cattle-crop

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<sup>1/</sup> For tables, see following Annex II C.

farm with 10 to 19 cattle on 10 to 99 hectares (about 105 farms). As in the previous case, assuming cattle earnings to be the principal source of income, total pre-project income would be about \$1,160 per family.

The actual opportunity cost of participation to the families who elect to participate in the project is less than the full amount of their present income because they will continue to cultivate a garden plot and earn some wage income. The opportunity cost for families represented by the Model A and B farms (assuming that one-third of wage income for farm A, and one-half the wage income of farm B, are forgone ) would be equivalent to crop income (excluding garden), cattle income and wages forgone or between \$560 and 600 per family. The cost incurred by the Median Farm C family would be equivalent to foregone crop and cattle income (excluding chickens and pigs), or about \$890.

b. Family income with project

i. Farm Models (Tables 2 (a) through (e))

Projected family incomes under the project were derived from the proposed farm models for the production of crops and milk with improved technology. They include some income earned from off-farm employment (by crop farmers) and from garden plots. The net income calculation was based on the technical coefficients of production under improved technology and the associated costs. Yields for all crops and for milk were conservatively projected. The farm budgets illustrate three family operated models and one jointly operated model.

The farm models described below illustrate only a few of the possible variations of crop - or crop and cattle - combinations and management alternatives. In project implementation there will be considerable variation in both, depending on soil conditions, availability of water, individual preferences and technical requirements. A number of mixed crop-cattle operations - particularly multi-family units may be created in those areas where Ca and Cp soils are inter-mixed. Similarly, the illustrative repayment schedules for long term loans and for land payment will be adjusted to individual circumstance.

Model 1, a partly irrigated crop farm, provides about \$1,600 net crop income (including home consumption) on 3 hectares. The modest level of fixed investment (\$600) reflects resettlement of participants on contiguous parcels, with joint ownership and operation of irrigation equipment. Substitution of onions or plaintains for tomatoes on some farms would vary farm size some-

what but not the on-farm investment.

Model 2, a rainfed crop farm, provides about \$1,700 of net crop income from 7.5 hectares. On many farms it is expected that the area devoted to corn would be much less and the area devoted to casava (or yams) would be increased so as to attain an equivalent income. In the latter cases farm size could be reduced.

Model 3, a family operated dairy/beef farm, provides \$1,500 of net income from livestock production by the fifth year and \$1,900 after year seven. The value of home consumption of milk reaches \$150 in year three. The total cost of on-farm investments of about \$12,400 is due to the need to provide almost all necessary infrastructure and cattle for participants. It is estimated that all participants in this activity will have at least five head of low grade cattle and that they will sell them in order to obtain part of the capital for investment in improved animals. To the extent that participants already own more than five cattle, the projected long-term loan requirement of \$11,000 per farm will be reduced.

It is expected that dairy/beef units will be about evenly divided between Model 3 (individual units) and Model 4 (jointly operated units - see below). Models 3 and 4 receive a labor advance slightly smaller than the value of family labor required for on-farm investments in the first two years of operation and yet sufficient to provide an annual cash surplus of \$700 (which would help maintain at least the level of pre-project family income during the starting up years for some families). The advance is repaid as part of the long-term loan.

Model 4, a jointly operated crop-dairy/beef operation, provides a net farm income \$3,680 for two families (\$1,840 per family) in year five. The level of investment per family is reduced compared to Model 3, and net farm income increases at a slightly faster rate. This is the only farm model which shows an expense for paid labor (\$100 per year) owing to the labor requirement for cultivating onions. The farm has the advantage of allowing multiple use of water facilities, i.e., for both crops and cattle, and it provides a degree of complementarity between crop and cattle production, especially in the use of manure for fertilizer. It also represents a module that can be expanded in accordance with needs and preferences.

Family income from other sources--wages and garden plots--was calculated as follows:

Off-farm Labor: It is estimated that participant families on crop farms will be able to offer approximately two-thirds of the 160 man-days of labor they previously sold to large cattle ranchers. At current off-season wage rates of \$2.50 per day, average family earnings from this source would be \$265 per year.

Garden Plot: The value of production from garden plots of \$200 per family was estimated by adjusting the 1970/71 added value of casava, yams, vegetables, sugar cane, bananas and plantains to current prices and by assuming a 20 percent volume increase from higher quality land and improved management.

ii. Economic and Financial Rates of Return at the Farm Level. (Tables 3a-d)

The economic rates of return were calculated by discounting net incremental benefits at the farm level. Incremental benefit equals gross farm-gate value of production plus home consumption less farm operating and investment expenditures, labor (at its opportunity cost) and pro-rated road and administrative costs. The economic rates of return for farm models 1 through 4 ranged from 14 to over 50 percent (Table 3). The financial rate of return to the participant families is greater because road and administrative costs and the opportunity costs of land and labor are not directly paid by them.

iii. Assumptions for Farm Model Analysis

--Opportunity cost of labor (crop farm): This was calculated by adding the estimated value of labor (at the shadow wage) previously employed on the typical family farm and the wages earned from an estimated 60 man-days of foregone off-farm labor. Family labor available is 368 days per year, less 55 days unemployed (15%) less 162 days worked off-farm, for an assumed total of 151 days worked on own farm at \$2.00 per day = \$300, plus 60 days foregone at \$2.50, or \$150, for a total value of \$450.

--Opportunity cost of labor (cattle farm): Assuming 300 man-days of family labor were required to manage a pre-project cattle-crop farm, the opportunity cost of employing this family in the project would be \$2 per day (shadow wage) times 300 days, or \$600 per year.

--Opportunity cost of cropland: This is equal to the average "net income" (after returns to labor at its

opportunity cost) per hectare of cropland in 1970/71 expressed in 1976 dollars, or \$40 per hectare  $\times$  1.42 = \$57 per hectare. (The value added per hectare of average cropland was \$113. Fifty-two man-days of labor were required per hectare of cropland in use in 1970. Assuming a shadow wage of \$1.40 per day and 52 man-days per hectare, value added minus the opportunity cost of labor was \$40 per hectare).

--Opportunity cost of grazing land. This is equal to the average "net income" (after returns to labor at its opportunity cost) per hectare produced on cattle land in 1970/71 expressed in 1976 dollar, or \$28/hectare  $\times$  1.42 = \$40/hectare, or \$800 per Model 3 farm. (The value added per hectare of average cattle land in Tonosi was \$36. Assuming a shadow wage of \$1.40 and 6 man-days of labor per hectare per year, value added minus the cost of labor equal \$28 net income per hectare. The present value of \$40 annuity payment received indefinitely is equal to \$333 which is the approximate current market value of average grazing land in Tonosi).

--Roads and administrative costs: The cost of project administration directly related to production includes: roads, field administration, surveys, forest conservation and streambed cleaning, which total \$3.6 million over 5 years. Assuming that these expenditures benefit 50% more families than the direct participants, 1,500 families receive project services over five years at an annual cost of \$820 per family in years one and two, and \$250 per family in years three to five.

--Sensitivity Analysis (Table 4): Product prices were decreased 10% and input costs were increased 10% to test the sensitivity of the rates of return to these changes.

--Shadow Prices: The price of rice was decreased 30%, corn and sorghum prices were decreased 25% and milk prices were increased 9% to reflect approximate cost of importing these products.

--The total value of the herd inventory in year 15 equals \$9,800, and salvage value of fixed investment equals \$1,000.

### 3. Area & Road Analysis. (Tables 5a-f)

The Tonosi district was divided into seven sub-project geographic areas for analysis purposes, based on agricultural potential, population, and development costs, as well as on natural

dividing lines such as rivers or roads. Aerial photography, topographic and soil maps, land use data, and visual observations were used to help identify the various areas. Candidate road segments were selected according to criteria discussed in Annex III. Each sub-project area was then analyzed to determine the economic feasibility of constructing one or more of the individual road segments. Internal rates of return (IRR's) for each of the sub-project areas range from 12 to 30 percent, for an average of 18 percent, with all but two in the 19-29 percent range.

Following selection of sub-project areas and identification of candidate roads, the number of hectares of land suitable for cultivation and or ranching were estimated. Land held with legal title is subtracted from this amount since it will be acquired only in exceptional cases. The remaining areas of crop and cattle land were assumed to be potentially available for resettlement purposes. However, because the present occupants of untitled land are allowed to keep 50 hectares of land as a matter of governmental policy and it is not yet known how many already have at least 50 hectares with title, not all untitled land will be available for resettlement (see Part II). Also, the land available for farming or ranching activities as represented by the sum of the sub-project areas is less than the land potentially available in the district according to soil types and topographic conditions because some parcels are too small or inaccessible.

The maximum number of participants is determined by the land-participant ratio required for the diverse cropping or cattle activities which can be carried out in the sub-project area. For example, in the Buenos Aires sub-project area approximately 570 hectares of untitled Ca land and 600 hectares of untitled Cp land are available after adjusting for the holdings of present occupants of untitled land. This would permit resettling a maximum of 163 crop farming participants and 30 milk producing participants.

Annual economic benefits to the participants in a sub-project area are estimated for the 15 year project life by calculating a percentage of the total project annual economic benefits from crop and cattle activities corresponding to the percentage of the total number of project participants projected respectively for crop and cattle activities in the sub-project area. Project benefits correspond to the increment in the net value of agricultural production attributable to the project. While most benefits accrue to project participants, other farmers and ranchers within the sub-project area will also benefit from project activities in the farm of an estimated 25% increase in their net value of agricultural

production. Participant and non-participant benefits are added to give total sub-project area benefits (Table 5).

Project costs are the additional off-farm costs incurred as a consequence of the project. (Other on-farm costs as well as crop storage investment costs were netted out at an earlier stage of analysis). Some costs, such as road construction and maintenance and stream-bed cleaning can be directly allocated to a specific sub-project area. Other costs, such as project administration costs, were pro-rated on the basis of the number of participants in a sub-project area. All relevant costs for each year of the 15 year project life are summed to give a stream of annual costs for each sub-project area.

Finally, for each sub-project area the annual costs of the project are subtracted from the yearly benefits attributable to the project, and the resulting 15 year stream of net benefits is discounted at a rate which gives a net present value of zero. If this internal rate of return (IRR) exceeds 12 percent, the approximate opportunity cost of capital in Panama, the sub-project is considered to be economically viable. Those sub-project areas which do not meet this criterion may still be included in the project under the selection criteria established in Annex III but will be of lower priority.

The basic assumptions for project benefit-cost analysis are also valid at the sub-project area level. In addition, the average net benefit per hectare for cropping activities induced by the project was multiplied by the number of hectares allocated for cropping activities in a sub-project area to arrive at the incremental net value of crop production in that sub-project area. The overall cropping pattern for the project was pro-rated to all sub-project areas.

#### 4. Overall Project Benefit-Cost Analysis (Table 6)

The project's internal rate of return of 18 percent was calculated by subtracting annual project costs from net project benefits and the stream of annual net benefits discounted to a present value of zero.

##### a. Project Benefits

Total economic benefits attributable to the project consist of benefits to both participants and non-participants. Participant benefits will be primarily increases in net farm income of the 900 full participant families. <sup>1/</sup>

<sup>1/</sup> The 100 dairy farmers to be serviced by the BNP/IBRD project were considered "non-participants" for the purpose of this analysis.

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was only 55% of the national average of \$519, <sup>2/</sup> and only 36% of the average for the metropolitan area. Assuming that the ratio of incomes outside the metropolitan area to the national rose to 60% by 1975 as a result of the Government's redistribution efforts, the per capita average in 1975 outside the metropolitan area would have been about \$560.

The preceding estimate of the magnitude of the income gap is supported by a national food consumption sample survey undertaken in mid-1975. The results show that, for Los Santos province (including the district of Tonosi), the mean earnings per capita of a rural family of 4.3 persons in June of that year were about \$27, and were less than one-third the income of an "urban" family. Nearly one-half of the rural families reported per capita monthly income of less than \$19, for an average of \$9. Of the urban families, only 16 percent were in the bottom income class, and their per capita average for the month was \$16.

There are no recent direct figures for average personal income or of its distribution in Panama. Mean per capita national income in 1975 was \$1,170 at current prices. In 1971, an estimated 84% of national income was distributed in the form of wages, salaries and other personal and non-corporate income. On this basis, per capita personal income in 1975 can be estimated at \$983.

The World Bank estimates that in 1970 the overall median per capita family income was 56% of the mean. Translated into 1975 terms, and assuming an improvement to 60% in that ratio, one-half of the country's population had per capita incomes of less than \$514. According to these same estimates, distribution of incomes outside the metropolitan area was extremely skewed (reflecting the very low per capita productivity of agriculture): forty-percent of the population had per capita incomes of less than the 1975 equivalent of \$280. Income estimates based on 1971 census information, indicate that 55 percent of the population in Tonosi is among the poorest of the poor; average per capita incomes were under \$200 - the official poverty level - after adjusting the volume of production for 1976 farmgate prices.

Considering the relative and absolute poverty in rural areas, especially Tonosi, a target income of \$400 per capita seems reasonable on equity as well as economic grounds.

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<sup>2/</sup> Applying a 65% inflation factor (average between rise of indexes of overall wholesale prices and Panama City consumer prices) this would be equivalent to \$856 in 1975.

development; and \$35 per hour for combine harvesting. Revenue from off-season services to non-participants was calculated at the rate of \$10 per hour. The projected cash flow has conservatively maintained the same level of machinery usage in the years subsequent to project development. It is also anticipated that there is a salvage value of at least 10% for all replaced machinery.

#### Operating Expenses

At full operation, the machinery pool will employ one chief mechanic, 2 mechanics, and 10 tractor drivers. They will be employed as needed in accordance with the purchase and arrival of the machinery. Salaries are the rates currently being paid in the Tonosi area.

Fuel and oil expenses were based on the number of hours of usage times 3 gallons of fuel consumption per hour, times \$0.85.

It is expected that the machinery pool will have the capability to sustain its own minor repair and maintenance program, whereas major repairs will be done at ENAMA's national facility in Santiago or by suppliers. Transport costs, as well as replacement of minor spare parts and reimbursement of major repairs, have been budgeted with the assumption that the annual cost of major repairs will be 20% of the value of the farm machinery.

Estimates of the average useful life of farm machinery in Panama, based on expert assessment, determined the machinery replacement program.

For the purposes of the cash flow, no inflation factors were considered because any increased costs would be offset by increases in rental rates (i.e. income). However, within the financial plan, there is a 20% reserve for inflation for the purchase of machinery and spare parts.

In summary, with normal, prudent management the machinery pool should be self-supporting. Even if revenue were not to reach its projected levels, solvency can be maintained since the major operating expenses are almost directly proportionate to revenue (usage). If less revenue is generated because of lower annual usage, operating expenses can be cut back, expenses for spare parts and major repairs will be reduced, and the machinery replacement program will be delayed due to lower machine life.

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2. Financial Analysis of Revolving Credit Fund<sup>1/</sup>

A \$4.5 million revolving credit fund, two-thirds and one-third financed by the loan and the GOP respectively, will be established within the BDA to handle the credit requirements of the project participants. The estimated cash flow of the fund was based upon an analysis of the phased aggregate credit requirements, (Table 8 ) and farm budgets ( above ) and through discussions with BDA officials. It is anticipated that the credit requirements for future integrated rural development projects will be partially financed with the cash surplus generated by the interest and principal recuperations under this loan.

The technical and financial analyses of the individual farmer credit needs are covered in Part III and in Section A above.

Table 2 illustrates the estimated 10 year cash flow of the revolving credit fund established within the BDA. It shows an accumulation of the individual agricultural purpose cash flows (Tables 3 to 7 ). The assumptions regarding grace period, interest rates, repayment period, and losses on loans shown at the bottom of the cash flows were developed with the BDA officials. For the purpose of this analysis, an eight percent interest rate was used since that is the current BDA's rate for small farmers. Since the BDA's experience shows that 1% of all loans are never repaid, all interest and principal repayments (inflows) were calculated on 99% of outflows. The inflows represent the loan and GOP contributions to the credit revolving fund, and the outflows represent the participants' credit requirements. Following is an explanation and analysis of the individual consolidated cash flows:

Crop Production Credit

Production credit is a recurring annual requirement; it is assumed that these requirements will be borrowed and repaid each year. Since money for labor requirements are reduced to zero over a period of three years, the annual requirements (outflows) decline each year until they level off. The BDA's experience also indicates that 10% of all repayments will be delinquent and will be collected in equal payments in the following two years, but interest payments of 8% are collected on the outstanding balances. By the sixth year when the labor requirements of all participants are zero, outflows will have leveled off to an annual demand of \$1.009 million, inflows will eventually level off at \$1.090 million, and the net annual positive cash flow will be \$0.81 million.

<sup>1/</sup> Unless otherwise indicated, tables are found in following Annex II D.

Crop Working Credit

The BDA normally provides one year of grace, 8% annual interest, and repayment between 3 and 5 years. A conservative four-year payback period was used. By the end of the eighth year, all principal and interest payments will have terminated and the cumulative cash balance will be \$286,000 or an increase of \$60,000 over the initial loan/GOP contribution to this element of the revolving fund.

Crop Infrastructure/Equipment

This fixed investment normally demands a grace period of 3-5 years (4 years was used), 8% interest charges, and principal repayments over 7 years. By the end of the tenth year, the cumulative cash balance is \$182,000, which exceeds by \$27,000 the original credit requirements of \$155,000. Furthermore, there will be an additional four years of principal and interest repayments.

Cattle Working Credit and Cattle Infrastructure/  
Equipment

Owing to the nature of these requirements and the long period normally associated with recuperating investments in dairy/cattle farming, these loans were assumed to provide an average grace period of 4 years, 8% interest, and principal repayment over 7 years. Whereas all of the crop/farming participants are planned to be active within three years, a few dairy participants will not be included until the fourth year. By the end of the tenth year, the cumulative cash balances are \$3,456,000 which exceeds by \$527,000 the original loan/GOP investment of \$2,929,000 to the credit revolving fund. Also, there will be an additional five years of interest and principal repayments.

Consolidated BDA Credit Revolving Fund

In addition to accumulating the financial data on the individual cash flows, the consolidated cash flow provides some additional financial information. The BDA collects a fee for processing loans, and this may be 0.5%, 0.75%, or 1% for loans of \$500 - \$1,000, \$1,000 - \$5,000, or over \$5,000, respectively. Since the project is designed for small farmers, a flat 0.75% for all loans (outflows) was used. The recurring outflows for agricultural farms represent the credit requirements for production credit after the participants' initial year. Administrative/operating and machinery/equipment expenses for the BDA cover only additional expenses

associated with the project, i.e., they are over and above their current expenses of operating the Tonosi branch office.

The consolidated cash flow indicates that sufficient revenue will be generated by the second year to permit the revolving fund to generate a positive cash flow. At the end of the fifth year, the revolving fund will have a cash surplus in excess of future years' outflows, and from that point on, all recuperations (inflows of principal and interest) would be available for use in other integrated rural development credit revolving fund projects. By year ten, there is expected to be a cumulative cash surplus of \$4,463,000 of which \$1,042,000 will need to be reserved for recurring credit requirements and operating expenses in the Tonosi area.

TONOSI: PRE-PROJECT FARMS

ANNEX II C  
Table Ia

A. Crop Farms of Less than 10 Hectares

<u>Crops</u>	<u>Hectares</u>	<u>Yield <sup>1/</sup> Metric Tons/Ha</u>	<u>Total</u>	<u>Price/MT <sup>2/</sup></u>	<u>Value of 1976 Production</u>
Rice	2.2	.36	.79	\$173	\$137
Corn	2.0	.33	.46	187	86
Beans	.4	.28	.11	328	36
Garden <sup>3/</sup>	<u>.4</u>	2.7	.97	224	<u>218</u>
Sub-total	5.0				\$477
<u>Livestock</u>					
Chickens (Inventory <sup>35</sup> )					122
Cattle and Pigs (Inventory, .9)					53
Sub-total					175
Gross Value of Production					652
Cost of Production <sup>4/</sup>					<u>138</u>
<u>Total Farm Income</u>					514
Other Income <sup>5/</sup>					<u>389</u>
<u>Total Family Income</u>					\$903

- 1/ Yield after allowing for assumed magnitude of share-cropping of rice, corn, and beans.
- 2/ 1970 prices adjusted upward by 6% annually.
- 3/ Garden is a composite of the remaining principal crops. It is assumed that all farms of less than 50 hectares maintain a garden plot.
- 4/ Based on estimated coefficients of cost of production (excluding labor) in the province; for crops 19% of gross value of production, for livestock 27%.
- 5/ Wages earned from off-farm work. In 1970, 788 families on farms of less than 10 hectares, and approximately 125 landless families provided an estimated 148,000 man-days of labor on large cattle ranches. At \$2.40 per day and 162 man-days per family average earnings equal \$389 in 1976.

TONOSI: PRE-PROJECT FARMS

ANNEX II c  
Table 1b

B. Median Cattle - Crop Farm

(7 Hectares Pasture, 2 Hectares Crop)

<u>Livestock</u>	<u>No.</u>	<u>Production<sup>1/</sup></u>	<u>Value/Unit (1976 Prices)</u>	<u>Value of 1976 Production</u>
Cows	3	1020 liters	\$ .15/liter	\$153
Heifers 2-3 yrs	1	98 kgs	.58/kg	57
Heifers 1-2 yrs	1	98 kgs	.58/kg	57
Calves	<u>2</u>	2 (6 mos)	45.00/head	<u>90</u>
Sub-total	7			357
Chicken/Pigs	20/2			<u>118</u>
Total Value Livestock				475
Cost of Production				<u>128</u>
Net Livestock Income				347
<u>Crops</u>				
Net Crop Income (as in A)				<u>386</u>
Total Farm Income				723
Other Income <sup>2/</sup>				<u>287</u>
Total Family Income				\$1,010

<sup>1/</sup> Two cows in milk for three-fourths lactation, average lactation 675 liters; weight gain for average dairy/beef cattle in Tonosf, 98 kgs/year, birth rate 60%.

<sup>2/</sup> Assuming three-fourths earnings of A. above.

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TONOSI; PRE-PROJECT FARMSANNEX II C  
Table 1cC. Median Cattle - Crop Farm on Marginal Land

(14 head of cattle, more than 10 hectares)

<u>Livestock</u>	<u>No.</u>	<u>Production</u>	<u>Value/Unit (1976 Prices)</u>	<u>Value of 1976 Production</u>
Cows	6	2040 liters	\$ .15/liter	\$306
Heifers 2-3 yrs	2	196 kgs	.58	114
Keifers 1-2 yrs	2	196 kgs	.58/kg	114
Calves	4	4 (6 mos.)	45.00/head	<u>180</u>
Sub-Total				714
Chickens, Pigs	20/2			<u>118</u>
Total Value Livestock				332
Cost of Production				<u>225</u>
Net Livestock Income				607

<u>Crops*</u>	<u>Hectares</u>	<u>Yield Metric Tons/ha</u>	<u>Total</u>	<u>Price M. T.</u>	<u>Total Value</u>
Rice	1.5	1.34	2.0	173	346
Corn	.33	1.75	.58	187	110
Garden	<u>.4</u>	2.70	1.0	224	<u>224</u>
Sub-Total	2.23				680
Cost of Crop Production					<u>129</u>
Net Crop Income					551
Total Farm Income					1158

\* Assuming this median farm earns two-thirds the crop income of an average 10-20 hectare farm.

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Annex II C

TABLE 2a

Page 1

## TONOSI: Partly Irrigated Crop Farm (Model 1)

A. Output by Year of Production

	<u>1</u>	<u>2</u>	<u>3 - 12</u>
<b>I. Land Use (Hectares)</b>			
Rice	3	3	3
Sorghum (double crop)	2	2	2
Tomatoes (double crop)	0.5	0.5	0.5
Total in Use	3	3	3
<b>II. Yield (Metric Tons/Hectare)</b>			
Rice	2.7	3.0	3.0
Sorghum	2.4	2.7	2.7
Tomatoes	22.0	24.0	24.0
<b>III. Output (MT)</b>			
Rice	8.1	9.0	9.0
Sorghum	4.8	5.4	5.4
Tomatoes	11.0	12.0	12.0
<b>A. Home Consumption</b>			
Rice	0.5	0.5	0.5
Tomatoes	0.2	0.2	0.2
<b>B. Sale</b>			
Rice	7.6	8.5	8.5
Sorghum	4.8	5.4	5.4
Tomatoes	10.8	11.8	11.8

TONOSI: Model 1

ANNEX II C.  
TABLE 2a  
Page 2

B. Farm Budget

Sales and Expenditures by Year of Production

	1	2	3	4	5	6	7 - 10	11	12
<u>Sales</u>									
Rice									
Sorghum	1,657	1,853							
Tomatoes	730	821							
	594	649							
Total	2,981	3,323	3,323	3,323	3,323	3,323	3,323	3,323	3,323
<u>Investment</u>									
Infrastructure									
Equipment	250								
Land Improvement	300								
	50				100	200		200	25
Sub-total	600							50	100
<u>Operating Expenses</u>									
Wages									
Seed	504	252	126						
Fertilizer	218	218	218	218					
Other Chemicals	421	421	421	421					
Materials	236	236	236	236					
Machinery Services	169	169	169	169					
	598	598	598	598					
Sub-total	2,146	1,894	1,768	1,642					
Interest 10%									
Total Operating Expenditures	2,146	1,894	1,768	1,642					
Total Expenditures	2,961	2,083	1,945	1,806	1,806	1,806	1,806	1,806	1,806
Year End Balance	20	1,240	1,378	1,517	1,906	2,006	1,806	2,056	1,931
					1,417	1,317	1,517	1,267	1,392

TONOSI: Model 1

ANNEX IIC  
TABLE 2a  
Page 3

C. Projected Cash Flow by Year of Production

	1	2	3	4	5	6	7 - 10	11	12
<b>Inflow</b>									
Sales	2,981	3,323	3,323	3,323	3,323	3,323	3,323	3,323	3,323
Long Term Loan for Infrastructure Equipment	600	-	-	-	-	-	-	-	-
Production Credit	-	-	-	-	-	-	-	-	-
Inputs	(1,642)	(1,642)	(1,642)	(1,642)	(1,642)	(1,642)	(1,642)	(1,642)	(1,642)
Labor	(504)	(252)	(125)	-	-	-	-	-	-
Sub-total	2,146	1,894	1,768	1,642	1,642	1,642	1,642	1,642	1,642
TOTAL	5,727	5,217	5,091	4,965	4,965	4,965	4,965	4,965	4,965
<b>Outflow</b>									
Investment	600	-	-	-	100	200	-	250	125
Operating Expenditures	1,642	1,642	1,642	1,642	1,642	1,642	1,642	1,642	1,642
Long Term Repayment	-	-	-	-	-	-	-	-	-
Principal	-	200	100	100	100	100	-	-	-
Interest	-	60	40	30	20	10	-	-	-
Production Credit Repayment	-	-	-	-	-	-	-	-	-
Principal	2,146	1,894	1,768	1,642	1,642	1,642	1,642	1,642	1,642
Interest	215	189	177	164	164	164	164	164	164
Land Repayment	-	-	-	-	-	-	100	-	125
TOTAL	4,603	3,985	3,727	3,578	3,668	3,758	3,548	3,698	3,698
<b>Annual Cash Surplus</b>	1,124	1,232	1,364	1,378	1,297	1,207	1,417	1,267	1,267

D. Other Family Income

Home Consumption	120	120	120	120	120	120	120	120	120
Garden Plot	200	200	200	200	200	200	200	200	200
Off-Farm Labor	265	265	265	265	265	265	265	265	265
TOTAL OTHER INCOME	585	585	585	585	585	585	585	585	585

E. Total Family Income

Cash Surplus (B) plus Other Income (C)	1,709	1,817	1,949	1,963	1,882	1,792	2,002	1,852	1,852
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ANNEX II c

TABLE 2a

Page 4

TONOSI: Family Farm Income, Year 5  
Model 1 (Partly Irrigated Crop Farm)

	C	R	O	P	S	
	Rice	Sorghum	Tomatoes	1/	TOTAL	
HECTARES	3	(2)	(0.5)		3.0	
Saleable Production (M.T.)	9	5.4	12			
Gross Sales (\$)	\$1,962	\$ 821	\$ 660		\$3,443	
Operating Expenses (\$):						
Seed	163	49	6		218	
Fertilizer	248	120	53		421	
Other Chemicals	123	64	49		236	
Packing Materials	79	40	50		169	
Machinery Services	<u>384</u>	<u>183</u>	<u>31</u>		<u>598</u>	
SUB-TOTAL	997	456	189		1,642	
10% Interest on op. exp. (\$)	100	45	19		164	
10% Interest on investment (\$)	--	--	--		.60	
TOTAL EXPENSES	1,097	502	207		1,866	
Net Farm Income (\$)	865	319	453		<u>\$1,577</u>	

1/ If no irrigable land available, rice area would be increased to 5 hectares.

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## ANNEX II C

## TABLE 2b

Page 1

## TONOSI: Rainfed Crop Farm (Model 2)

A. Output by Year of Production

	<u>1</u>	<u>2</u>	<u>3-12</u>
I. Land Use (Hectares)			
Corn	7	7	7
Cowpeas (double crop)	1	1	1
Cassava	0.5	0.5	0.5
Total Area	7.5	7.5	7.5
II. Yield (Metric Tons/ha)			
Corn	2.5	2.7	2.7
Cowpeas	1.0	1.2	1.2
Cassava	14.0	16.0	16.0
III. Output (Mt)			
Corn	17.5	18.9	18.9
Cowpeas	1.0	1.2	1.2
Cassava	7.0	8.0	8.0
A. Home Consumption			
Corn	0.3	0.3	0.3
Cowpeas	0.1	0.1	0.1
Cassava	0.1	0.1	0.1
B. Sale			
Corn	17.2	18.6	18.6
Cowpeas	.9	1.1	1.1
Cassava	6.9	7.9	7.9

B. Farm Budget

Sales and Expenditures by Year of Production

	1	2	3	4	5	6	7-10	11	12
<u>Sales</u>									
Corn	3,062	3,311	3,311						
Cowpeas	290	354	354						
Cassava	290	332	332						
Total	3,642	3,997	3,997	3,997	3,997	3,997	3,997	3,997	3,997
<u>Investment</u>									
Infrastructure	260								
Equipment	140							50	
Sub-total	400					140		140	
<u>Operating Expenses</u>									
Wages	357	178	90	-					
Seed	156	156	156	156					
Fertilizer	583	583	583	583					
Other Chemicals	197	197	197	197					
Materials	244	244	244	244					
Machinery Services	976	976	976	976					
Sub-total	2,513	2,334	2,246	2,156					
Interest 10%	251	233	225	216					
Total Operating Exp.	2,764	2,567	2,471	2,372	2,372	2,372	2,372	2,372	2,372
Total Expenditure	3,214	2,567	2,471	2,372	2,372	2,512	2,372	2,562	2,372
Year End Balance	428	1,430	1,526	1,625	1,625	1,485	1,625	1,435	1,625



## ANNEX II C

TABLE 2b  
Page 4TONOSI: Family Farm Income, Year 5  
Model 2 (Rainfed Crop Farm)

	C R O P S			TOTAL
	Corn	Cowpeas	Cassava	
HECTARES	7	(1.0) <u>1/</u>	0.5	7.5
Saleable Production (M.T.)	18.9	1.2	8	-
Gross Sales (\$)	3,364	386	336	4,086
Operating Expenses (\$):				
Seed	42	59	55	156
Fertilizer	510	31	42	583
Other Chemicals	153	38	6	197
Packing Materials	172	12	60	244
Machinery Services	<u>828</u>	<u>104</u>	<u>44</u>	<u>976</u>
SUB-TOTAL	1,705	244	207	2,156
10% Interest on op. exp. (\$)	171	24	21	216
10% Interest on investment (\$)	--	--	--	40
TOTAL EXPENSES	1,876	268	228	2,412
Net Farm Income (\$)	1,488	118	108	<u>1,674</u>

1/ Double cropping in dry season.

TONOSI: Dairy/Beef Ranch (Model 3)A. Output by Year of Production

I. <u>MILK</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5 - 12</u>
Cows in Lactation	8	12	18	18	18
Lactation Period (days)	210	220	230	240	
Production/Cow (Liters)	3,75	4.25	4.75	5.25	5.25
Total Production/ Cow/Year (Liters)	788	935	1,090	1,260	1,260
Total Production/ Year (Liters)	6,300	11,220	19,665	22,680	22,680
Sale	5,880	10,560	18,630	21,600	21,600
Home Consumption	420	660	1,035	1,080	1,080
II. <u>BEEF</u>	<u>(Number of Head)</u>				
Male Calves (Weaned)	-	4	6	7	9
Cull Cows	-	-	-	4	5
Heifers, 3 years	-	-	-	-	2
Heifers, 2 years	-	-	-	-	2

TONOSI: Model 3

B. Expenditures and Sales

	.....Y E A R S .....											
	1	2	3	4	5	6	7	8	9	10	11	12
<u>Investments</u>												
Pastures												
Fencing	1,210	730	480									
Water Supply	870	510	357									
Building, Silo	1,050										1,210	730
Forage Chopper	850											
Cattle	730											
Total	5,600					730						
	10,310	1,240	837			1,000					730	
						1,730					1,000	
											2,940	730
<u>Operating Costs</u>												
Pasture Maintenance	183	348	306	409	489							
Fodder Crop	30	60	120	120	120							
Drugs and Service	130	176	216	239	239							
Molasses	103	134	193	267	267							
Mineralized Salt	62	69	83	83	83							
Maintenance and Equipment	100	100	200	200	200							
Miscellaneous Op. Exp.	17	28	34	40	40							
Sub-Total	625	915	1,232	1,438	1,438							
TOTAL EXPENDITURE	10,935	2,155	2,069	1,438	1,438	1,438	1,438	1,438	1,438	1,438	1,438	1,438
						3,168	1,438	1,438	1,438	1,438	4,378	2,168





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Tonosf: Model 3.

ANNEX II C  
TABLE 2c  
Page 5

F. Investments by Year.

	Units	Unit Cost	1		2		3		6		11		12	
			Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost	Units	Cost
<b>Pastures</b>														
Improved	19 ha.	120	9.5	1140	5.5	660	4	480			9.5	1140	5.5	660
Podder Crop	1 ha.	140	.5	70	.5	70					.5	70	.5	70
Sub-Total				<u>1210</u>		<u>730</u>		<u>480</u>				<u>1210</u>		<u>730</u>
<b>Fencing</b>														
Water Supply	3.4 km	510	1.7	867	1.0	510	.7	357						
		1050	1	1050										
<b>Buildings</b>														
Milking shed	1	700	1	700										
Trench silo	1	150	1	150										
Sub-Total				<u>850</u>										
<b>Forage Chopper</b>														
	1	730	1	730					1	730		730		
<b>Cattle</b>														
Cows and	7	2800	7	2800										
Heifer Calves 0-1 yr.	7	-	7	-										
Heifer- 1-2 yrs	4	600	4	600										
Heifers 2-3 yrs.	4	1200	4	1200										
Bull	1	1000	1	1000					1	1000		1000		
Sub-Total				<u>5600</u>						<u>1000</u>		<u>1000</u>		
Total Investment				10,307		1,240		837		1,730		2,940		730

TONOSI: Family Farm Income, Year 5  
Model 3 (Dairy/Beef Ranch - 20 hectares)

ANIMALS (Year end Inventory)	Bulls	Breeding Cows	Heifers 2-3 years	Heifers 1-2 years	Calves Female	Calves Male
Number	1	22	7	7	9	9

	Total Animals	Animal Units	Carrying Capacity (AU/ha)
Number	53	38	1.9

<u>SALES:</u>	<u>DOLLARS</u>
Milk Sales	3,564
Animal Sales	<u>2,560</u>
Total Sales	<u>6,124</u>

<u>Operating Expenses</u>	
Pasture Maintenance	489
Animal Health	239
Silage	120
Molasses & Minerals	350
Others	<u>200</u>
Sub-total	1,398
8% interest on Op. Exp.	40
8% interest on investment loan	825
Principal repayment	2,200
Land payment	<u>150</u>
Total Expenses	<u>4,613</u>
Net Farm Income	<u><u>1,511</u></u>

TONOSI: Two-Family Dairy-Crop Farm (Model 4)

Crop Component <sup>1/</sup>

A. Output by Year of Production

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6-12</u>
I. <u>Land Use</u>						
Onions	.5	.5	.5	.5	.5	.5
Plantain	1.0	2.0	2.0	2.0	2.0	2.0
II. <u>Yield (Metric/Tons/ha.)</u>						
Onions	13.8	15.0	15.0	15.0	15.0	15.0
Plantain	4.5	6.8	12.5	16.0	13.0	11.4
III. <u>Output (M.T.)</u>						
Onions	6.9	7.5	7.5	7.5	7.5	7.5
Plantain	4.5	13.5	25.0	32.0	26.0	22.8
A. Home Consumption						
Onions <sup>2/</sup>	—	—	—	—	—	—
Plantain	.1	.3	.3	.3	.3	.3
B. Sale						
Onions	6.9	7.5	7.5	7.5	7.5	7.5
Plantain	4.4	13.2	24.7	31.7	25.7	22.5

<sup>1/</sup> For dairy component, see Model 3.

<sup>2/</sup> Less than .05

TONOSI: Model 4

B. Sales and Expenditures By Year of Production

	1	2	3	4	5	6	7-10	11	12
<u>Sales</u>									
Onions	1,904	2,070	2,070	2,070	2,070	2,070	2,070	2,070	2,070
Plantains	258	772	1,445	1,854	1,503	1,316	1,316	1,316	1,316
Total	<u>2,162</u>	<u>2,842</u>	<u>3,515</u>	<u>3,924</u>	<u>3,573</u>	<u>3,386</u>	<u>3,386</u>	<u>3,386</u>	<u>3,386</u>
<u>Investment</u>									
Infrastructure	200								
Equipment	550							70	
Sub-total	<u>750</u>				<u>300</u>	<u>250</u>		<u>300</u>	<u>250</u>
								<u>370</u>	<u>250</u>
<u>Operating Expenses</u>									
Wages <sup>1/</sup>	705	352	176	96	96	96			
Seed	187	187	124	124	156	156			
Fertilizer	166	205	178	182	216	204			
Other Chemical	178	209	215	215	213	213			
Materials	119	119	119	119	119	119			
Machinery Service	80	146	284	405	335	275			
Sub-total	<u>1,435</u>	<u>1,218</u>	<u>1,096</u>	<u>1,141</u>	<u>1,135</u>	<u>1,063</u>			
Interest 10%	144	122	110	114	114	106			
Total Op. Exp.	<u>1,579</u>	<u>1,340</u>	<u>1,206</u>	<u>1,255</u>	<u>1,249</u>	<u>1,169</u>	<u>1,169</u>	<u>1,169</u>	<u>1,169</u>
Total Expenditures	2,329	1,340	1,206	1,255	1,549	1,419	1,169	1,539	1,419
Year End Balance	(167)	1,502	2,309	2,669	2,024	1,967	2,217	1,847	1,967

<sup>1/</sup> Labor advance years 1-3, hired labor expenditure years 4-12

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C. Projected Cash Flow By Year of Production

	1	2	3	4	5	6	7-10	11	12
<u>Inflow</u>									
Sales	2,162	2,842	3,515	3,924	3,573	3,386	3,386	3,386	3,386
Loan for Investments	750								
Production Credit									
Inputs	730	866	920	1,045	1,039	967			
Labor	705	352	176	96	96	96			
Sub-total	1,435	1,218	1,096	1,141	1,135	1,063	1,063	1,063	1,063
Total	4,347	4,060	4,611	5,065	4,708	4,449	4,449	4,449	4,449
<u>Outflow</u>									
Investment	750								
Operating Expenditures	826	962	1,016	1,141	300	250		370	250
Long Term Loan Repayment					1,135	1,063	1,063	1,063	1,063
Principal	--	150	150	150	150	150			
Interest	--	75	60	45	30	15			
Production Credit									
Repay									
Principal	1,435	1,218	1,096	1,141	1,135	1,063	1,063	1,063	1,063
Interest	144	122	110	114	114	106	106	106	106
Land Payment	--	--	150	300	--	--			
Total	3,155	2,527	2,582	2,891	2,864	2,647	2,232	2,602	2,482
<u>Annual Cash Surplus</u>	1,192	1,533	2,029	2,174	1,844	1,802	2,217	1,847	1,967

TONOSI: Model 4

D. Other Family Income

	1	2	3	4	5	6	7-10	11	12
Garden Plot Plus Home Consumption	220	240	240	240	240	240	240	240	240

E. Total Income Crop Component

Annual Surplus Plus Other Income	1,412	1,773	2,269	2,414	2,084	2,042	2,457	2,087	2,207
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F. Total Income, Dairy-Crop Model

Dairy Component	960	1,020	1,214	1,369	1,861	2,006	2,389	2,246	3,706
Crop Component	<u>1,412</u>	<u>1,773</u>	<u>2,269</u>	<u>2,414</u>	<u>2,084</u>	<u>2,042</u>	<u>2,457</u>	<u>2,087</u>	<u>2,207</u>
Total	2,372	2,793	3,483	3,783	3,945	4,048	4,846	4,333	5,913

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TONOSI: Farm Income Year 5

## Model 4 Two-Family Dairy-Crop Unit

	<u>CROPS</u>			<u>CATTLE</u>	<u>TOTAL</u>
	<u>Onions</u>	<u>Plantain</u>	<u>Total</u>	<u>Pasture</u>	
<u>Hectares</u>	.5	2.0	2.5	20	22.5
Saleable Production (MT)	7.5	26	-	-	
	<u>D O L L A R S</u>				
Gross Sales	2,070	1,520	3,590	6,142	9,732
Operating Expenses					
Hired Labor	96	-	96		
Seed	124	32	156		
Fertilizer	76	140	216		
Other Chemicals	153	60	213		
Materials	119	-	119		
Machinery Services	32	303	335		
Sub-Total	600	535	1,135	1,438	2,573
10% Interest on Op.Exp.	60	54	114	-	114
8% Interest on Investment	-	-	30	835	865
Principal Repayment	-	-	150	2,200	2,350
Land Payment	-	-	-	150	150
Total Expenses	660	589	1,429	4,623	6,052
Net Farm Income	1,410	931	2,161	1,519	<u>3,680</u>

ANNEX IIC  
Table 2e

TONOSI: FARM MODELS 1, 2 and 4

A. Detailed Investment Costs - Crop Models

<u>Item</u>	<u>Model 1</u>	<u>Model 2</u>	<u>Model 4</u>
Equipment and Tools	150	140	300
Irrigation	150	-	250
Fencing	30	50	20
Leveling	50	-	50
Shed	<u>220</u>	<u>210</u>	<u>130</u>
Total	<u>600</u>	<u>400</u>	<u>750</u>

B. Cost Assumptions for Investments

Equipment and tools include portable sprayers (\$90 each) and hand tools. Irrigation equipment includes a pump and tubing; \$1,500 average investment per 5 hectares. Equipment will be shared by adjoining farms.

Model 4 investment in irrigation equipment was reduced by \$500 since this amount is provided in the budget for water supply in the dairy component.

Leveling: 7 machine hours per hectare at \$14.00 per hour.

Shed: \$10 per square meter

Fencing: Only 1.2 kilometers of fence (\$510 per kilometer) will be required per 100 hectares, or \$6 per hectare, since existing and new (dairy/beef) fencing will be available for joint use.

TONOSI: INTERNAL RATE OF RETURN ANALYSIS OF FARM MODELS  
MODEL 1

ANNEX II C  
Table 3a

Year	BENEFITS Sales plus Home Consumption	COSTS					NET INCREMENTAL BENEFIT		
		Operating Expenses	Invest- ments	Labor Expense	Land 1/ Dollars	Adminis- tration	Total	Undiscounted	Discounted 50%
1	3,100	1,640	600	450	200	820	3710	(610)	(407)
2	3,440	1,640	-	450	200	820	3110	(330)	(147)
3	3,440	1,640	-	450	200	250	2540	900	266
4	3,440	1,640	-	450	200	250	2540	900	178
5	3,440	1,640	-	450	200	250	2540	900	119
6	3,440	1,640	200	450	200	-	2490	950	84
7	3,440	1,640	-	450	200	-	2290	1150	68
8	3,440	1,640	-	450	200	-	2290	1150	45
9	3,440	1,640	-	450	200	-	2290	1150	30
10	3,440	1,640	-	450	200	-	2290	1150	20
11	3,440	1,640	250	450	200	-	2540	900	11
12	3,440	1,640	125	450	200	-	2415	1025	8
13	3,440	1,640	-	450	200	-	2290	1150	6
14	3,440	1,640	-	450	200	-	2290	1150	3
15	3,440	1,640	-	450	200	-	2290	1150	2

1/ Land in irrigable areas is valued at twice the average opportunity cost of land.

IRR is over 50%

TONOSI: INTERNAL RATE OF RETURN ANALYSIS OF FARM MODELS  
MODEL 2

ANNEX II C  
Table 3b

Year	BENEFITS Sales plus Home Consumption	COSTS					NET INCREMENTAL BENEFIT		
		Operating Expenses	Invest- ments	Labor Expense Dollars	Land	Adminis- tration	Total	Undiscounted	Discounted 50%
1	3730	2,160	400	450	300	820	4130	(400)	(267)
2	4090	2,160	-	450	300	820	3730	(360)	(160)
3	4090	2,160	-	450	300	250	3160	930	275
4	4090	2,160	-	450	300	250	3160	930	184
5	4090	2,160	-	450	300	250	3160	930	123
6	4090	2,160	140	450	300	-	3050	1040	92
7	4090	2,160	-	450	300	-	2910	1180	70
8	4090	2,160	-	450	300	-	2910	1180	46
9	4090	2,160	-	450	300	-	2910	1180	31
10	4090	2,160	-	450	300	-	2910	1180	20
11	4090	2,160	190	450	300	-	3100	990	12
12	4090	2,160	-	450	300	-	2910	1180	9
13	4090	2,160	-	450	300	-	2910	1180	6
14	4090	2,160	-	450	300	-	2910	1180	4
15	4090	2,160	-	450	300	-	2910	1180	2

IRR is over 50%

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TONOSI: INTERNAL RATE OF RETURN ANALYSIS OF FARM MODELS  
MODEL 3

ANNEX IIC  
Table 3c

Year	BENEFITS Sales plus Home Consumption	COSTS					NET INCREMENTAL BENEFIT		
		Operating Expenses	Invest- ments	Labor Expense	Land	Adminis- tration	Total	Undiscounted	Discounted 14%
-Dollars-									
1	1030	610	10,310	600	800	820	13140	(12,110)	(10,740)
2	2220	885	1,240	600	800	820	4345	( 2,125)	( 1,635)
3	3765	1200	835	600	800	250	3685	80	54
4	4950	1400	-	600	800	250	3050	1,900	1,125
5	6275	1400	-	600	800	250	3050	3,225	1,674
6	6575	1400	1,730	600	800	-	4530	2,045	932
7	6275	1400	-	600	800	-	2800	3,475	1,390
8	6275	1400	-	600	800	-	2800	3,475	1,219
9	6275	1400	-	600	800	-	2800	3,475	1,070
10	6275	1400	-	600	800	-	2800	3,475	938
11	6575	1400	2,940	600	800	-	5740	835	162
12	6275	1400	730	600	800	-	3530	2,745	540
13	6275	1400	-	600	800	-	2800	3,475	632
14	6275	1400	-	600	800	-	2800	3,475	556
15	16925	1400	-	600	800	-	2800	14,125	<u>2,000</u>

IRR = 14%

(83)

TONOSI: INTERNAL RATE OF RETURN ANALYSIS OF FARM MODELS  
MODEL 4

ANNEX II C  
Table 3d

Year	BENEFITS	COSTS					NET INCREMENTAL BENEFIT		
	Sales plus Home	Operating Expenses	Investments	Labor Expense Dollars	Adminis- tration 1/	Total	Undiscounted	Discounted 20%	
1	2,200	730	750	600	200	3570	5850	(3650)	(3040)
2	2,880	865	-	600	200	3570	5235	(2355)	(1635)
3	3,550	920	-	600	200	250	1970	1580	915
4	3,965	1,040	-	600	200	250	2099	1875	904
5	3,610	1,040	300	600	200	250	2390	1220	490
6	3,430	960	250	600	200	-	2010	1420	476
7	3,430	960	-	600	200	-	1760	1670	466
8	3,430	960	-	600	200	-	1760	1670	389
9	3,430	960	-	600	200	-	1760	1670	324
10	3,430	960	-	600	200	-	1760	1670	271
11	3,430	960	370	600	200	-	1390	2040	275
12	3,430	960	250	600	200	-	1510	1920	215
13	3,430	960	-	600	200	-	1760	1670	155
14	3,430	960	-	600	200	-	1760	1670	130
15	3,430	960	-	600	200	-	1760	1670	109

1/ Includes a \$5,500 "assessment" to reflect a one-half hectare share of the financial cost of constructing onion drying and storage facilities for the projected production from the project.

IRR = 20%

TONOSI: SENSITIVITY ANALYSIS OF INTERNAL  
RATES OF RETURN, FARM MODELS 1-4

<u>Assumptions</u>	<u>Rate of Return by Model</u>			
	<u>1</u>	<u>2</u> (percent)	<u>3</u>	<u>4a/</u>
1. Best estimate prices, yields, operating expenditures, and investments; opportunity cost of land and labor; plus cost of road improvements and administration.	<u>b/</u>	<u>b/</u>	14	20
2. Same as 1 except prices decrease by 10% and operating and investment costs increase by 10%.	16	16	9	12
3. Same as 1 except products are shadow priced.	10	<u>c/</u>	11	12

a/ Crop Component of Model 4.

b/ Greater than 50%

c/ Less than 5%

ANNEX II C  
TABLE 5a

TONOSI: INTERNAL RATE OF RETURN OF SUB-AREAS  
Rio Viejo Abajo  
(\$000's)

YEAR	BENEFITS			COST (\$1000's)	NET BENEFITS	
	Part.	Non-Part.	Total		Undiscounted	Discounted 30%
1	0	0	0	223	(223)	(171)
2	(10)	20	10	54	(44)	(32)
3	(10)	30	20	43	(23)	(10)
4	40	40	80	38	42	15
5	150	40	190	38	152	41
6	150	40	190	5	185	38
7	140	40	180	5	175	29
8	140	40	180	5	175	22
9	140	40	180	5	175	16
10	150	40	190	5	185	14
11	150	40	190	5	185	10
12	140	40	180	5	175	8
13	140	40	180	5	175	6
14	140	40	180	5	175	4
15	150	40	190	5	185	<u>4</u> (6)

IRR = 30%

No. of Participants: Crop 94  
Cattle 0

No. of Hectares: Crop 330  
Cattle 0

ANNEX II C  
TABLE 5bTONOSI: INTERNAL RATE OF RETURN OF SUB-AREAS  
MADRE VIEJA  
(\$000's)

YEAR	BENEFITS			COST	NET BENEFITS	
	Part.	Non-Part.	Total		Undiscounted	Discounted 25%
1	0	0	0	303	(303)	(243)
2	(30)	10	(20)	80	(100)	( 64)
3	(50)	20	(30)	65	( 95)	( 49)
4	10	40	50	57	( 7)	( 3)
5	180	40	220	57	163	53
6	220	40	260	5	255	67
7	210	40	250	5	245	51
8	220	40	260	5	255	43
9	220	40	260	5	255	34
10	230	40	270	5	265	28
11	240	40	280	5	275	24
12	230	40	270	5	265	18
13	230	40	270	5	265	15
14	230	40	270	5	265	12
15	350	40	390	5	385	<u>13</u> ( 1)

IRR= 25%

No. of Participants: Crop 128  
Cattle 10No. of Hectares: Crop 450  
Cattle 210

ANNEX II C  
TABLE 5c

## TONOSI: INTERNAL RATE OF RETURN OF SUB-AREAS

BUENOS AIRES  
(\$000's)

YEAR	BENEFITS			COST	NET BENEFITS	
	Part.	Non-Part.	Total		Undiscounted	Discounted 25%
1	0	0	0	321	(321)	(268)
2	(110)	10	(100)	111	(211)	(135)
3	(130)	40	(90)	90	(180)	(92)
4	(40)	50	10	79	(69)	(28)
5	210	40	250	13	237	78
6	310	40	350	10	340	89
7	320	40	360	10	350	74
8	340	40	380	10	370	62
9	350	40	390	10	380	51
10	350	40	390	10	380	41
11	370	40	410	10	400	34
12	340	40	380	10	370	25
13	330	40	370	10	360	20
14	340	40	380	10	370	16
15	700	40	740	10	730	<u>26</u>
						1

IRR = 25 %

No. of Participants: Crop 163  
Cattle 30

No. of Hectares: Crop 570  
Cattle 600

TONOSI: INTERNAL RATE OF RETURN OF SUB-AREAS

CANAS  
(\$000's)

YEAR	BENEFITS			COST	NET BENEFITS	
	Part.	Non-Part.	Total		Undiscounted	Discounted 24%
1	0	0	0	140	(140)	(113)
2	(110)	10	(100)	56	(156)	(101)
3	(120)	20	(100)	45	(145)	( 76)
4	( 70)	40	( 30)	39	( 69)	( 29)
5	70	30	100	39	61	21
6	160	30	190	4	186	51
7	180	30	210	4	206	46
8	200	30	230	4	226	40
9	220	30	250	4	246	35
10	220	30	260	4	246	29
11	230	30	260	4	256	24
12	200	30	230	4	226	17
13	190	30	220	4	216	13
14	200	30	230	4	226	11
15	590	30	620	4	616	<u>25</u>
						( 7)

IRR 24%

No. of Participants: Crop 68      No. of Hectares: Crop 240  
 Cattle 33                                      Cattle 660

ANNEX II C  
TABLE 5e

TONOSI: INTERNAL RATE OF RETURN OF SUB-AREAS  
GUANICO  
(\$000's)

YEAR	BENEFITS			COST	NET BENEFITS		
	Part.	Non-Part.	Total		Undiscounted	Discounted 15% 20%	
1	0	0	0	392	(392)	(341)	(327)
2	(230)	10	(220)	241	(461)	(348)	(319)
3	(260)	40	(220)	89	(309)	(203)	(180)
4	(160)	60	(100)	79	(179)	(102)	( 85)
5	110	60	(170)	79	91	45	37
6	320	60	380	10	370	160	124
7	350	60	410	10	400	150	112
8	400	60	460	10	450	147	105
9	430	60	490	10	480	136	93
10	430	60	490	10	480	119	78
11	460	60	520	10	510	110	69
12	400	60	460	10	490	84	50
13	380	60	440	10	430	70	40
14	390	60	450	10	440	62	34
15	1210	60	1270	10	1260	155	82
						244	( 88)

IRR = 19%

No. of Participants: Crop 127 Cattle 69 No. of Hectares: Crop 450 Cattle 1380

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ANNEX II C  
TABLE 5f

## TONOSI: INTERNAL RATE OF RETURN OF SUB-AREAS

JOAQUIN ARRIBA

(\$000's)

YEAR	BENEFITS			COST	NET BENEFITS	
	Part.	Non-Part.	Total		Undiscounted	Discounted 12%
1	0	0	0	200	(200)	(178)
2	(70)	10	(60)	21	( 81)	( 65)
3	(80)	20	(60)	17	( 77)	( 55)
4	(60)	10	(50)	15	( 65)	( 41)
5	(10)	20	10	15	( 5)	( 3)
6	50	20	70	2	68	34
7	60	20	80	2	78	35
8	70	20	90	2	88	36
9	80	20	100	2	98	35
10	80	20	100	2	98	32
11	90	20	110	2	108	31
12	70	20	90	2	88	23
13	70	20	90	2	188	21
14	70	20	90	2	188	18
15	320	20	340	2	388	<u>62</u> ( 15)

IRR = 12%

No. of Participants: Crop 14      No. of Hectares: Crop 50  
 Cattle 21                                      Cattle 420

ANNEX II C.  
TABLE 5g

TONOSI: INTERNAL RATE OF RETURN OF SUB-AREAS  
CORTEZO - TRONOSA - PINTADA  
(\$000's)

YEAR	BENEFITS			COST	NET BENEFITS	
	Part.	Non-Part.	Total		Undiscounted	Discounted 12%
1	0	0	0	206	(206)	(184)
2	(300)	10	(290)	446	(736)	(589)
3	(340)	40	(300)	70	(370)	(263)
4	(270)	50	(220)	63	(283)	(180)
5	( 50)	50	0	63	( 63)	( 36)
6	190	50	240	10	250	127
7	230	50	280	10	270	122
8	290	50	340	10	330	133
9	320	50	370	10	360	130
10	320	50	370	10	360	115
11	360	50	410	10	400	115
12	280	50	430	10	420	108
13	270	50	420	10	410	94
14	280	50	430	10	420	87
15	1270	50	1330	10	1320	<u>242</u>
						21

IRR = 12 %

No. of Participants: Crop 60      No. of Hectares: Crop 240  
Cattle 86                                      Cattle 2580

TONOSI: OVERALL RATE OF RETURN ANALYSIS  
(\$000)

YEAR	PROJECT BENEFITS						Total Benefits (7)
	Participant Benefits			Non-Participants Benefits			
	(1) With Project*	(2) Without Project	(3) Project Induced (1)-(2)	(4) With Project	(5) Without Project	(6) Project Induced (4)-(5)	
						(3) + (6)	
1	0	0	0	1710	1710	0	
2	(670)	200	(870)	1580	1510	70	(800)
3	(590)	390	(980)	1510	1310	200	(780)
4	20	560	(540)	1440	1150	290	(250)
5	1320	680	640	1350	1050	300	940
6	2080	680	1400	1350	1050	300	1700
7	2160	680	1480	1350	1050	300	1780
8	2340	680	1660	1350	1050	300	1960
9	2440	680	1760	1350	1050	300	2060
10	2460	680	1780	1350	1050	300	2080
11	2580	680	1900	1350	1050	300	2200
12	2320	680	1640	1350	1050	300	1940
13	2270	680	1590	1350	1050	300	1890
14	2300	680	1620	1350	1050	300	1920
15	5240	680	4560	1350	1050	300	4860

\* Investment expenditures for grain and onion storage (130, 450, 480 for years 2, 3 and 4) were subtracted from "With Project Benefits".

No. of Participants: Crop 650  
Cattle 250

No. of Hectares Utilized: Crop 2,300  
Cattle 9,700

TONOSI: OVERALL RATE OF RETURN ANALYSIS  
(\$000)

Year	PROJECT COSTS				Total Cost (12)	Net Benefits (13) (7) - (12)	Discounted Benefits		
	(8) Administration	(9) Road Construction & Maintenance	(10) Forest Conservation	(11) Streambed Cleaning			(14) 15 %	(15) 20 %	
1	1120	762	117	34	2033	(2033)	(1769)	(1693)	
2	460	737	34	19	1250	(2050)	(1650)	(1423)	
3	360	19	34	19	432	(1212)	( 798)	( 702)	
4	310	19	34	17	380	( 530)	( 337)	( 284)	
5	310	19	34	17	380	560	278	225	
6	0	19	34	0	53	1643	710	550	
7	0	19	34	0	53	1727	649	481	
8	0	19	34	0	53	1907	624	444	
9	0	19	34	0	53	2007	570	389	
10	0	19	34	0	53	2027	501	328	
11	0	19	34	0	53	1943	418	262	
12	0	19	34	0	53	1887	353	211	
13	0	19	34	0	53	1837	299	171	
14	0	19	34	0	53	1867	263	146	
15	0	19	34	0	53	4807	591	312	
IRR = 18%							802	(583)	

4/17

ANNEX IID  
Table 1

CASH FLOW FOR FARM MACHINERY SERVICES (\$000's)

	1 1978	2 1979	3 1980	4 1981	5 1982	6 1983	7 1984	8 1985	9 1986	10 1987	11 1988	12 1989
BEGINNING CASH ON HAND	100	95	165	242	307	372	200	181	239	292	357	149
<b>INCOME:</b>												
<b>AGRICULTURE SERVICES</b>												
Plowing, Harrowing, Sowing & spraying @ \$11/hr.		73	121	121	121	121	121	121	121	121	121	121
Combine Harvesting @ \$35/hr.		28	47	47	47	47	47	47	47	47	47	47
<b>DAIRY</b>												
Pasture Cleaning @ \$10/hr.		13	25	25	25	25	25	25	25	25	25	25
Pasture Development @ \$11/hr.		14	14	14	14	14	14	14	14	14	14	14
Off-Season Usage - Non-Participants @ \$10/hr.		13	25	25	25	25	25	25	25	25	25	25
Total Revenue from Machinery Services		141	232	232	232	232	232	232	232	232	232	232
Salvage Value - 10% of Machine Replacement						26	9	1	1			
Total Income		141	232	232	232	258	241	233	233	232	263	242
TOTAL AVAILABLE CASH FOR OPERATIONS	100	236	397	474	539	630	441	414	472	524	620	391
<b>OPERATING EXPENSES:</b>												
Labor												
1 Chief Mechanic (\$1,920/yr.)	1	2	2	2	2	2	2	2	2	2	2	2
2 Mechanics (\$1,440/yr.)	1	3	3	3	3	3	3	3	3	3	3	3
10 Tractor Drivers (\$1,800/yr)	3	13	18	18	18	18	18	18	18	18	18	18
Fuel & Oil (Nr. Hrs. Usage X 3 Gal./Hr. X \$0.85).		29	48	48	48	48	48	48	48	48	48	48
Transport Costs		4	5	5	5	5	5	5	5	5	5	5
Minor Spare Parts Replacement		5	5	5	5	5	5	5	5	5	5	5
Major Repairs (20% of Machinery Value) 1/		15	74	86	86	86	86	86	86	86	86	86
Machinery Replacement of Original Equip.						263	93	8	13		41	10
Machinery Replacement of Replacement Equip.												
Total Expenses	5	71	155	167	167	430	260	175	180	167	263	94
NET CASH ON HAND END OF YEAR	95	165	242	307	372	200	181	239	292	357	149	120

1/ Major repairs are calculated on 20% of the value of the machinery pool. In discussions with machinery representatives, they indicated that the costs of major repairs are usually allocated on a three-quarters, one-quarter basis between spare parts and labor, respectively. The annual weighted average of the costs of spare parts to machinery value is 12.6%, but for purposes of financial analysis, a conservative figure of 15% was used; thereby, resulting in a labor factor of 5% for a total of 20%. A year's supply of spare parts will be purchased with the equipment and this has been considered in the costs for major repairs in years two and three.

In years one and two, there will be machinery purchases of \$345,200 and \$83,200 respectively.

ANNEX II D  
Table 2

CONSOLIDATED CASH FLOW OF BDA CREDIT REVOLVING FUND (\$000's)

	1 1979	2 1980	3 1981	4 1982	5 1983	6 1984	7 1985	8 1986	9 1987	10 1988
<b>INFLOW - BDA &amp; LOAN FUNDS</b>										
<b>AGRICULTURAL FARMS</b>										
Production Credit	822	253	151							
Working Credit	136	56	34							
Infrastructure/Equipment	93	38	24							
<b>CATTLE FARMS</b>										
Working Capital	892	420	239	11						
Infrastructure/Equipment	598	438	261	70						
<b>INTEREST PAYMENTS</b>										
Original Loans		201	294	345	340	333	310	281	245	210
Late Principal Repayments			6	12	13	13	12	12	12	12
<b>PRINCIPAL REPAYMENTS</b>										
Regular Payments		733	975	1084	999	1190	1271	1330	1333	1332
Late Payments			41	93	110	109	103	101	100	100
0.75% Handling Fee	---	19	15	13	9	8	8	8	8	8
Sub-Totals	2541	2158	2040	1628	1471	1653	1704	1732	1698	1862
<b>OUTFLOWS</b>										
Agricultural Farms - Initial	1051	437	263							
Cattle Farms - Initial	1490	858	500	81						
Agricultural Farms - Recurring		714	958	1059	1022	1009	1009	1009	1009	1009
BDA Additional Adm./Oper. Exp.	20	32	33	33	33	33	33	33	33	33
BDA Additional Mach. & Equipment	29	1								
Sub-Totals	2590	2042	1754	1173	1055	1042	1042	1042	1042	1042
Annual Cash Surplus (Deficit)	(49)	116	286	455	416	611	662	690	656	620
Cumulative Cash Surplus (Deficit)	(49)	67	353	808	1224	1835	2497	3187	3843	4463

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ANNEX II D  
Table 3

LOANS FOR AGRICULTURAL PRODUCTION CREDIT (\$000's)

	1 1979	2 1980	3 1981	4 1982	5 1983	6 1984	7 1985	8 1986	9 1987	10 1988
<b>INFLOW - LOAN/BDA FUNDS</b>										
Year 1 PARTICIPANTS	822									
Year 2 PARTICIPANTS		253								
Year 3 PARTICIPANTS			151							
<b>INTEREST PAYMENTS</b>										
Year 1 - Original Loans		65	56	52	48	48	48	48	48	48
Year 2			27	24	22	20	20	20	20	20
Year 3				16	14	13	12	12	12	12
Year 1 - Late Payments			6	3	3	3	2	2	2	2
Year 2				6	5	5	5	5	5	5
Year 3				3	1	1	1	1	1	1
					2	2	2	2	2	2
						1	1	1	1	1
<b>PRINCIPAL REPAYMENTS</b>										
Year 1 - Regular Payments		733	636	588	539	539	539	539	539	539
Year 2			306	266	246	225	225	225	225	225
Year 3				183	158	146	134	134	134	134
Year 1 - Late Payments			41	40	35	52	30	30	30	30
Year 2				36	33	30	30	30	30	30
Year 3				17	17	14	13	12	12	12
					15	14	13	13	13	13
					10	10	9	8	7	7
						9	8	8	8	8
Sub-Totals	822	1051	1223	1234	1150	1113	1093	1091	1090	1090
<b>OUTFLOWS</b>										
Year 1 PARTICIPANTS	822	714	660	605	605	605	605	605	605	605
Year 2 PARTICIPANTS		343	298	276	253	253	253	253	253	253
Year 3 PARTICIPANTS			205	178	164	151	151	151	151	151
Sub-Totals	822	1057	1163	1059	1022	1009	1009	1009	1009	1009
Annual Balance	0	(6)	60	175	128	104	84	82	81	81
Cumulative Balance	0	(6)	54	229	357	461	547	627	708	789

ASSUME: No grace period, 8% interest, 90% repayments yearly with balance repaid equally over following two years, labor requirements reduce to 50%, 25%, & 0% in succeeding years, 1% of loans are uncollectible.

ANNEX II D  
Table 4

LOANS FOR AGRICULTURAL WORKING CREDIT (\$000)

	1 1979	2 1980	3 1981	4 1982	5 1983	6 1984	7 1985	8 1986	9 1987	10 1988
<b>INFLOW - LOAN/BDA FUNDS</b>										
Year 1 PARTICIPANTS	136									
Year 2 PARTICIPANTS		56								
Year 3 PARTICIPANTS			34							
<b>INTEREST PAYMENTS</b>										
Year 1	-	11	11	8						
Year 2			4	4	5	3				
Year 3				3	3	2	1			
<b>PRINCIPAL PAYMENTS</b>										
Year 1										
Year 2			33	34	34	34				
Year 3				13	14	14	14			
Sub-Totals	136	67	82	62	67	63	25	9		10
<b>OUTFLOWS</b>										
Year 1 PARTICIPANTS	136									
Year 2 PARTICIPANTS		56								
Year 3 PARTICIPANTS			34							
Sub-Totals	136	56	34	0	0	0	0	0		0
Annual Balance	0	11	48	62	67	63	25	9		10
Cumulative Balance	0	11	59	121	188	251	276	286		

ASSUME: 1 year grace period, 8% interest, repayment in 4 years, 1% of loans are uncollectible.

ANNEX II D  
Table 5

		<u>LOANS FOR AGRICULTURAL INFRASTRUCTURE/EQUIPMENT (\$000)</u>									
		1	2	3	4	5	6	7	8	9	10
		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
<u>INFLOW - LOAN/DA FUNDS</u>											
Year 1	PARTICIPANTS	93									
Year 2	PARTICIPANTS		38								
Year 3	PARTICIPANTS			24							
<u>INTEREST REPAYMENTS</u>											
Year 1											
Year 2			7	7	7	7	7	6	5	4	3
Year 3				3	3	3	3	3	3	2	2
					2	2	2	2	2	2	1
<u>PRINCIPAL REPAYMENTS</u>											
Year 1											
Year 2							13	13	13	13	13
Year 3								5	5	5	5
	Sub-Totals	93	45	34	12	12	25	29	31	29	27
<u>OUTFLOWS</u>											
Year 1	PARTICIPANTS	93									
Year 2	PARTICIPANTS		38								
Year 3	PARTICIPANTS			24							
	Sub-Totals	93	38	24	0	0	0	0	0	0	0
	Annual Balance	0	7	10	12	12	25	29	31	29	27
	Cumulative Balance	0	7	17	29	41	66	95	126	155	182

ASSUME: 4 year grace period, 8% interest, repayment in 7 years, 1% of loans are uncollectible.

ANNEX II D  
Table 6

LOANS FOR CATTLE WORKING CREDIT (\$000)

	1 1979	2 1980	3 1981	4 1982	5 1983	6 1984	7 1985	8 1986	9 1987	10 1988
<b>INFLOW - LOAN/BDA FUNDS</b>										
Year 1 PARTICIPANTS	892									
Year 2 PARTICIPANTS		420								
Year 3 PARTICIPANTS			239							
Year 4 PARTICIPANTS				11						
<b>INTEREST REPAYMENTS</b>										
Year 1		71	71	71	71	71	61	50	40	30
Year 2			33	33	33	33	33	29	24	19
Year 3				19	19	19	19	19	16	14
Year 4					1	1	1	1	1	1
<b>PRINCIPAL REPAYMENTS</b>										
Year 1						126	126	126	126	126
Year 2							59	59	59	59
Year 3								33	34	34
Year 4									1	1
Sub-Totals	892	491	343	134	124	250	299	317	301	284
<b>OUTFLOWS</b>										
Year 1 PARTICIPANTS	892									
Year 2 PARTICIPANTS		420								
Year 3 PARTICIPANTS			239							
Year 4 PARTICIPANTS				11						
Sub-Totals	892	420	239	11	0	0	0	0	0	0
Annual Balance	0	71	104	123	124	250	299	317	301	284
Cumulative Balance	0	71	175	298	422	672	971	1288	1589	1873

ASSUME: 4 year grace period, 8% interest, principal repayment in 7 years, 1% of loans are uncollectible.

ANNEX II D  
Table 7

LOANS FOR CATTLE INFRASTRUCTURE/EQUIPMENT (\$000's)

	1 1979	2 1980	3 1981	4 1982	5 1983	6 1984	7 1985	8 1986	9 1987	10 1988
<b>INFLOW - LOAN/BDA FUNDS</b>										
Year 1 PARTICIPANTS	598									
Year 2 PARTICIPANTS		438								
Year 3 PARTICIPANTS			261							
Year 4 PARTICIPANTS				70						
<b>INTEREST REPAYMENTS</b>										
Year 1										
Year 2		47	47	47	47	47	41	34	27	20
Year 3			35	35	35	35	35	30	25	20
Year 4				21	21	21	21	21	18	15
					6	6	6	6	6	5
<b>PRINCIPAL REPAYMENTS</b>										
Year 1										
Year 2						85	85	85	85	84
Year 3							62	62	62	62
Year 4								37	37	37
Sub-Totals	598	485	343	173	109	194	250	275	270	253
<b>OUTFLOWS</b>										
Year 1 PARTICIPANTS	598									
Year 2 PARTICIPANTS		438								
Year 3 PARTICIPANTS			261							
Year 4 PARTICIPANTS				70						
Sub-Totals	598	438	261	70	0	0	0	0	0	0
Annual Balance	0	47	82	103	109	194	250	275	270	253
Cumulative Balance	0	47	129	232	341	535	785	1060	1330	1583

ASSUME: 4 year grace period, 8% interest, principal repayment in 7 years, 1% of loans are uncollectible.

TONOSI: Estimated Incremental Credit Requirements for  
All Project Activities by Purpose and Year  
(000\$)

ACTIVITY AND PURPOSE	CALENDAR YEAR					TOTAL INCREMENTAL
	1979	1980	1981	1982	1983	
AGRICULTURE: CROPS	1051	347	209	-	-	1,607
A) Fixed Investments:	93	38	24	-	-	155
1. Land Improvements	12	5	3	-	-	20
2. Fencing	11	4	3	-	-	18
3. Buildings	70	29	18	-	-	117
B) Working Capital:	136	56	34	-	-	226
1. Equipment	136	56	34	-	-	226
C) Production Credit:	822	253	151	-	-	1,226
1. Machinery Services	210	89	53	-	-	352
2. Seed	116	48	29	-	-	193
3. Fertilizer	137	57	34	-	-	228
4. Other Chemicals	65	27	16	-	-	108
5. Packing Materials	77	32	19	-	-	128
6. Labor	217	-	-	-	-	217
AGRICULTURE: CATTLE	1,490	858	500	81	-	2,929
A) Fixed Investment:	651	506	293	81	-	1,531
1. Pasture Improvement	182	186	91	27	-	486
2. Fencing	130	132	100	43	-	405
3. Water	158	66	39	-	-	263
4. Buildings & Silos	128	54	31	-	-	213
5. Labor	53	68	32	11	-	164
B) Working Capital:	839	352	207	-	-	1,398
1. Cattle	729	306	180	-	-	1,215
2. Equipment	110	46	27	-	-	183
GRAND TOTAL:	2,541	1,205	709	81	-	4,536
A. Investment 1/	1,719	952	558	81	-	3,310
B. Production Credit	822	253	151	-	-	1,226

1/ Includes fixed investment and working capital.

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ANNEX II E  
Table 1

TONOSI: Types of Project Participants by Corregimiento and Zone

Type of Participant	ZONES											Grand Total
	I					II				III	IV	
	CORREGIMIENTOS											
	Tonosí	El Bebe- dero	Flores	El Cacao	Total	A. de Guera	El Corte- zo	La Tro- nosa	Total	Cañas	Guani- co	
1	--	70	20	5	95	50	45	55	150	40	45	330
2	65	50	25	30	170	20	15	25	60	50	20	300
3	--	15	110	10	135	25	20	30	75	30	55	295
4	--	39	20	5	64	50	30	30	110	20	40	234
5	8	20	5	5	38	17	10	15	42	10	20	110
6	50	60	15	45	170	--	10	40	50	20	80	320
(7)	--	--	(15)	--	(15)	(5)	(15)	(5)	(25)	--	--	(40)
<b>TOTAL:</b>	123	254	195	100	672	162	130	195	487	170	260	1,589

SOURCE: Estimated on the basis of 1970 census tabulations, cadastral land capability mapping and field observation.

## ANNEX II E

TABLE 2

TONOSI: Five Year Phased Land Use and Production Program  
for Project Participants

	1979/80		1980/81		1981/82		1982/83		1983/84	
	Has.	MT								
	(60%)		(85%)		(100%)		(100%)		(100%)	
<b>Rainfed crops: 1/</b>										
Rice	480	1,296	680	2,040	800	2,400	800	2,400	800	2,400
Corn	420	1,050	595	1,607	700	1,890	700	1,890	700	1,890
Sorghum	(330)	792	(467)	1,261	(550)	1,485	(550)	1,485	(550)	1,485
Cowpeas	(90)	90	(128)	154	(150)	180	(150)	180	(150)	180
Cassava	120	1,680	170	2,220	200	3,200	200	3,200	200	3,200
Yams	60	720	85	1,275	100	1,500	100	1,500	100	1,500
Sugar cane	60	2,700	85	4,250	100	5,000	100	5,000	100	5,000
Sub-total	1,140		1,615		1,900		1,900		1,900	
	(420)		(595)		(700)		(700)		(700)	
<b>Irrigated crops:</b>										
Plantains	120	540	170	1,530	200	1,800	200	1,800	200	1,800
Tomatoes 2/	60	1,320	85	2,040	100	2,400	100	2,400	100	2,400
Onions 2/	60	828	85	1,275	100	1,500	100	1,500	100	1,500
Sub-total	240		340		400		400		400	
<b>Cattle: 3/</b>										
Improved pasture	2,910		5,929		8,514		9,425		9,700	
Milk prod. (000) liters	1,235		2,735		5,148		6,725		7,405	

1/ Figures in parentheses signify double cropping.

2/ May be double cropped with rice in rainy season.

3/ Includes approximately 100 ranchers who will receive credit and technical assistance from resources other than the project.

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TABLE 3

TONOSI: Potential Lands for Agricultural Development,  
by Service Zones and Corregimiento

Zone and Corregimiento	Total Area		Potential Cropland (Ca)* 1/		Potential Pastures (Cp)*		Controlled Grazing, Forests and Wasteland (N, RF, F)*	
	Hectares	%	Hectares	%	Hectares	%	Hectares	%
Zone 1								
Tonosí	3,120	100	1,905	61	40	1	1,175	38
El Bebedero	11,890	100	3,331	28	4,099	34	4,478	38
Flores	13,480	100	456	3	1,872	14	11,152	83
El Cacao	7,430	100	2,887	39	1,755	24	2,788	37
	35,920	100	8,561	24	7,766	22	19,593	54
Zone 2								
Altos de Guera	12,860	100	0	0	5,925	46	6,935	54
El Cortezo	15,600	100	0	0	5,867	38	9,733	62
La Tronosa	10,140	100	960	9	4,104	41	5,076	50
	38,600	100	960	3	15,896	41	21,744	56
Zone 3								
Cañas	13,280	100	2,143	16	2,541	19	8,596	65
Zone 4								
Guánico	47,700	100	3,515	7	5,672	12	38,513	81
District Total:	135,500	100	15,179	11	31,875	24	88,446	65

\* Refers to symbols on Map 2-A.

1/ Includes approximately 5,000 has. subject to flooding.

ANNEX II-E  
TABLE 4

TONOSI: Availability of Agricultural Land; Present and Projected  
Location of Participants, by Service Zone and Corregimiento

Service Zone and Corregimiento	Agric. Lands Physically Available			Agricultural Lands		Participant Location		
	Cropland	Pasture land	Total	Titled*	Non-titled**	Present (1970)	Projected	
	----- (H e c t a r e s) -----						(N° of families)	
Zone 1								
Tonosí	1,905	40	1,945	1,282	663	100	30	
El Bebedero	3,313	4,099	7,412	3,055	4,357	148	210	
Flores	456	1,872	2,328	758	1,570	166	70	
El Cacao	2,887	1,755	4,642	1,858	2,784	82	140	
Sub-total	8,561	7,766	16,327	6,953	9,374	496	450	
Zone 2								
Altos de Guera	0	5,925	5,925	353	5,572	96	95	
El Cortezo	0	5,867	5,867	722	5,145	66	80	
La Tronosa	960	4,104	5,064	638	4,426	115	110	
Sub-total	960	15,896	16,856	1,713	15,143	277	285	
Zone 3								
Cañas	2,143	2,541	4,684	883	3,801	147	120	
Zone 4								
Guánico	3,515	5,672	9,187	600	8,587	164	145	
Total:	15,179	31,875	47,054	10,149	36,905	1,084	1,000	

\* Source: Reforma Agraria, Min. of Agriculture, 1977.

\*\* Most of the non-titled agricultural land is occupied and in some agricultural use.

TONOSI: Projected Aggregate Labor Requirements on Participant Farms 1/  
by Type of Farming and Crop Year compared with Potential Family  
Labor Availability 2/

Type of Farming	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>
<u>Requirements:</u>					
	(M a n - y e a r s)				
Crops	323.5	458.3	539.1	539.1	539.1
Milk/Beef	210.0	275.1	323.3	277.0	260.6
All farms	533.5	733.4	862.4	816.1	799.7
<u>Availability</u> <u>2/</u>	864.0	1,224.0	1,440.0	1,440.0	1,440.0
<u>Surplus</u> (Annual basis)	330.5	490.6	577.6	623.9	640.3
	P e r c e n t o f A v a i l a b i l i t y				
	38	40	40	43	44

1/ Based on participation of 60% in year 2, 85% in year 3 and 100% as of year 4.

2/ Based on 1.6 man/years per family at 250 days per man/year.

ANNEX II E  
TABLE 6

TONOSI: Assumed Prices and Projected Yields of Products

	Farmgate Price (\$/M.T.)	Yield		
		Year of Production Plan		
		<u>1</u>	<u>2</u>	<u>3-5</u>
Rice	218.00	2.7	(MT/Ha) 3.0	3.0
Corn	178.00	2.5	2.7	2.7
Sorghum	152.00	2.4	2.7	2.7
Cowpeas	322.00	1.0	1.2	1.2
Cassava	42.00	14.0	16.0	16.0
Yam	212.00	12.0	15.0	15.0
Sugar Cane	12.75	45.0	50.0	50.0
Plantains	58.50	4.5	9.0	16.0
Tomatoes	55.00	22.0	24.0	24.0
Onions	276.00	13.8	15.0	15.0
			(Liters per lactation)	
Milk (¢/liter)	16.5	790	935	1,260
Calves (\$/head)	90	-	-	-
Cull Cows (\$/head)	150	-	-	-
Heifers, 2 years	200	-	-	-
Heifers, 3 years	300	-	-	-

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ANNEX II E  
Table 7TONOSI: PROJECTED HOURS<sup>1/</sup> OF MACHINERY USE BY MONTH, YEARS 3-5

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	----- (Hours of Field Operation) -----												
Plowing, Harrowing			1580	1900	1280						1500	990	7,250
Sowing, Spraying	280	225	75	40	850	1285	635					410	3,800
Harvesting: Combine Thresher		150	550						200	600			1,350 150
Pasture Development				625	625								1,250
Pasture Cleaning							625	625	625	625			2,500
<b>TOTAL</b>	<b>280</b>	<b>375</b>	<b>2205</b>	<b>2565</b>	<b>2755</b>	<b>1285</b>	<b>1260</b>	<b>625</b>	<b>825</b>	<b>1225</b>	<b>1500</b>	<b>1400</b>	<b>16,300</b>

<sup>1/</sup> Hours required for participant production only.

ANNEX II E  
Table 8

TONOSI: ESTIMATED GROSS VALUE OF PRODUCTION AND VALUE ADDED OF CROPS AND LIVESTOCK BY CORREGIMIENTO - 1970  
(\$000)

	Farms	Gross Value of Production		Value Added			Land Use (Hectare)		Value Added Per Hectare		Average Value Added Per Farm
		Crops	Livestock	Crops	Livestock	Total	Annual & Perennial	Pasture	Crops	Livestock	
Cabecera <sup>1/</sup>	167	\$133.0	\$ 953.1	\$106.7	\$ 697.2	\$803.9	676	3,371	\$158	\$207	\$ 4,813
Altos de Guero	187	85.2	232.6	68.3	170.1	238.4	470	4,666	145	36	1,275
Cañas	207	51.9	351.6	41.6	257.2	298.8	275	6,549	157	39	1,443
El Bebedero	298	80.2	367.0	64.3	268.5	332.8	839	6,960	77	39	1,117
El Cacao	127	43.3	105.9	34.7	77.5	112.2	343	2,317	101	33	883
El Cortezo	110	46.3	193.6	37.1	141.6	178.7	331	4,530	112	31	1,625
Flores	169	43.2	237.1	34.6	173.4	208.0	368	4,938	94	35	1,230
Guánico	301	90.4	533.8	72.5	390.5	463.0	964	11,185	75	35	1,538
La Tronosa	213	93.7	197.1	75.1	144.2	219.3	481	3,649	156	40	1,030
<b>Total</b>	<b>1,779</b>	<b>\$667.3</b>	<b>\$3,171.8</b>	<b>\$534.9</b>	<b>\$2,320.2</b>	<b>\$2,855.1</b>	<b>4,747</b>	<b>47,665</b>	<b>\$113</b>	<b>\$ 49</b>	<b>\$ 1,605</b>

<sup>1/</sup> Apparently this corregimiento was attributed with some production from an adjoining corregimiento (Guánico).

SOURCE: Census of Agriculture - 1971

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ANNEX II E  
Table 9

TONOSI: Net Return Per Hectare of Crops Under Improved Technology, Year 5

Detail	Rice	Corn	Sorghum	Cowpea	Cassava	Yam	Sugar Cane		Plantain			Tomatoes	Onion
							(Year)		(Year)				
							1	2-4	1	2	3-4		
Gross Value of Production	654	481	410	386	672	3,180	574	638	263	527	936	1,320	4,140
Cost of Production													
Family Labor	45	105	17	42	168	315	165	105	291	147	171	672	1,005
Seed	54	6	25	50	110	440	160	-	63	-	-	12	248
Fertilizer	83	73	60	31	84	135	67	58	90	39	63	107	152
Other Chemicals	41	22	32	39	13	13	9	4	25	31	31	98	306
Packing Materials	26	24	20	12	120	234	-	-	-	-	-	100	238
Machinery Service	128	118	92	104	88	171	182	132	48	66	186	61	63
Total with Labor	377	348	245.0	288	583	1,308	563	299	517	283	451	1,050	2,012
Total without Labor	332	243	229.0	246	415	993	418	194	226	136	280	378	1,007
Net Operating Income													
Excluding Labor	322	238	181	140	257	2,187	156	444	37	391	656	942	3,133

Tonosí: Dairy/Beef Farm

ANNEX II E  
TABLE 10

Herd Projection

.....Y E A R.....

Herd Category	Initial Purchase	.....Y E A R.....							
		1	2	3	4	5	6	7	8-12
		<u>Herd Composition</u>							
Bulls	1	1	1	1	1	1	1	1	1
Breeding Cows	7	11	15	22	22	22	22	22	22
Heifers 2-3 yrs.	4	4	7	4	5	5	5	5	5
Heifers 1-2 yrs.	4	6	4	6	7	7	7	7	7
Heifers calves	7	4	6	8	9	9	9	9	9
Males calves	-	4	6	7	9	9	8	9	9
Total Animals	<u>23</u>	<u>31</u>	<u>39</u>	<u>48</u>	<u>53</u>	<u>53</u>	<u>52</u>	<u>53</u>	<u>53</u>
Animal Units	16	23	28	31	38	38	38	38	38
		<u>Mortality</u>							
Adult animals				1	2		1		1
Calves		1	1	1	1	1	2	1	1
Total		<u>1</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>2</u>

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## Tonosi: Dairy/Beef Farm

Production Coefficients  
and Technical Indicators

	.....Y E A R.....					
	1	2	3	4	5	6-12
Total Pasture (ha)	20	20	20	20	20	20
Carrying Capacity	1.2	1.4	1.6	1.9	1.9	1.9
Calving rate (%)	80	85	85	85	85	85
Mortality adults (%)	-	3	3	3	2	2
calves (%)	8	8	8	8	5	5
Cow Culling (%)	-	-	-	18	23	23
No. of cows	11	15	22	22	22	22
No. of cows in milk	8	12	18	18	18	18
Lactation Period	210	220	230	240	240	240
Net Production/Cow/day (lts) <u>1/3.5</u>		4.0	4.5	5.0	5.0	5.0
Net Production/Cow/yr (lts)	735	880	1035	1200	1200	1200
Total Sale Industrial Milk (lts)	5880	10,560	18,630	21,600	21,600	21,600
Labor Requirements for Investments (man-days)						
Improved Pasture	133	49	84			
Fodder crop	7	7				
Fencing	34	20				
Silo	20	-	-			
Total	<u>194</u>	<u>76</u>	<u>84</u>			

1/ Net after home consumption and calf feeding

Tonosí: Dairy/Beef Farm  
Detailed Investment Cost 1/

I Pasture Development

Units Total Cost  
.....per hectare..

A. Improved Pasture

Land Preparation (hired machinery hours)	3	20
Land Preparation (man-day)	10.0	--
Seeds (kg)	4	40.0
Fertilizer (kg)	136	42.0
Herbicide (liters)	5.7	18.0
Labor (man-days)	3.5	--
Total		<u>120.0</u>

B. Fodder Crop

Land Preparation (hired machinery hours)	3	20
Land Preparation (man-days)	10.0	--
Seeds (kg)	4	40.0
Fertilizer (kg)	200	62
Herbicide (liters)	5.7	18.0
Labor (man-day)	3.5	--
Total		<u>140.0</u>

II. Fencing-New

Units Total Cost  
.....per kilometer..

Wire (rolls)	10	290.0
Posts	50	55
Intermediate posts	500	150
Staples (kg)	10	15.0
Labor (man-day)	20	--
Total		<u>510.0</u>

III Stock Water Supply

.....per farm..

Dam (contract)	300
Hydraulic Ram	200
Tank	200
Piping	200
Installation	150
Total	<u>1,050</u>

1/ From IBRD, Second Livestock Development Project, Panama 1976. Some changes were made to reflect Tonosí situation.

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IV Buildings	Units	Total Cost
	.....per farm..	
A. Milking Shed		
Materials		500
Labor (contract)		<u>200</u>
Total		700
B. Trench Silo		
Materials		150
Labor (man-days)	15	<u>--</u>
Total		150
V Machinery & Equipment		
Forage Chopper		730
VI Cattle Purchase		
Bulls	1	1,000
Cows with heifer calf	7	2,800
Heifers 2-3yrs.	4	1,200
Heifers 1-2 yrs.	4	600
Sub-Total		<u>5,600</u>
Less Participant Contribution		740
Total Outlay for Cattle		<u>4,860</u>

Tonosf: Dairy/Beef Farm

Farmgate Cost and Price Assumptions

A. Investment Cost Assumptions

Fencing			
Main posts		\$	1.10 each
Small intermediate posts			.30 each
Wire			29.00 roll
Staples			1.43 kg
Fertilizer			308.00 ton
Herbicides			3.17 liter
Labor: provided by participants and by contract			
Pasture seed and vegetable material equivalent			10.00 kg
Plowing and harrowing (hired machinery).			20.00 ha
Participant contribution, sale of cull animals from initial inventory as follows:			

Cows	2 head	\$ 150 each	=	\$ 300
Heifers 2-3 yrs	1 head	200		200
Heifers 1-2 yrs	1 head	150		150
Calves	1 head	90		90
		TOTAL		<u>740</u>

B. Operating Cost Assumptions

Labor: provided entirely by participant and family, one man-year for each 20 milking cow.		
Pasture maintenance: 60 kg of fertilizer per hectare year (\$18.25) plus seed for annual replanting (\$7.50)		25.75 ha
All pastures are fertilized each year		
Fodder Grass Maintenance and Silage Making: 250 kg of fertilizer per hectare, fuel for grass chopper molasses, urea, and plastic for silage making, and seed for annual re-planting		120.00 ha
Molasses Supplement: 495 liters/milking cow/year x \$0.3 liter		14.84 cow
Mineralized Salt: 16.85 kg/au/year		2.20 a.u.
Drugs and Veterinary Services		6.33 a.u.
Maintenance Materials and Miscellaneous Equipment		200.00 yr.
Interest 10% of 3 mo. operating cost		40.00 yr.

C. Price Assumptions (Sales)

Cattle	
Bull (700 kg)	300
Cull Cows (350 kg)	150
Breeding Heifers 3 yrs.	300
Cull Heifers 1-2 yrs.	150
Cull Heifers 2-3 yrs.	200
Male Calves (weaned)	90
Milk US\$/liter (farmgate)	\$ .165

PANAMA  
Banco de Desarrollo Agropecuario  
Condensed Balance Sheets, 1973-76  
 (US\$ '000 equivalent)

ANNEX II E  
 Table i4

<u>As of December 31,</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
<u>Current Assets</u>				
Cash and deposits BNP:	2,533	2,528	3,057	2,080
Deferred expenses and prepayments	<u>176</u>	<u>209</u>	<u>1,162</u>	<u>874</u>
Total	<u>2,709</u>	<u>2,737</u>	<u>4,219</u>	<u>2,954</u>
<u>Long-Term Assets</u>				
<u>Loan Portfolio</u>				
Agricultural/livestock sector	24,265	35,318	45,249	49,134
Government institutions	312	6,658	5,741	2,924
Less provision for losses	(1,405)	(1,592)	(1,837)	(2,026)
Fixed Assets (net of accumulated depreciation)	3,122	3,123	3,083	3,106
Property investments	1,676	1,646	1,577	1,602
Other investments				
Government bonds and equity	<u>119</u>	<u>119</u>	<u>129</u>	<u>100</u>
Total	<u>28,089</u>	<u>45,272</u>	<u>53,942</u>	<u>54,840</u>
Total Assets	<u>30,798</u>	<u>48,009</u>	<u>58,161</u>	<u>57,794</u>
<u>Current Liabilities</u>				
Accounts payable	213	619	635	244
Government institutions and agencies				
Social security institute bonds	209	220	232	439
MIDA - cooperative credit	704	1,185	2,507	4,501
Foreign bank loans	-	<u>6,500</u>	<u>467</u>	<u>467</u>
Total	<u>1,126</u>	<u>8,524</u>	<u>3,841</u>	<u>5,651</u>
<u>Long-Term Liabilities</u>				
Foreign bank loans	4,058	11,428	11,900	7,933
Social security institute bonds	2,376	2,156	1,924	1,701
IDB loans	241	-	2,467	3,936
USAID program loans	-	-	800	1,353
IBRD - 901 PAN livestock I project	-	96	263	309
Total	<u>6,675</u>	<u>13,680</u>	<u>17,354</u>	<u>15,232</u>
<u>Net Worth</u>				
<u>Capital</u>				
Paid-in and subscribed by Government				
General agriculture	24,094	27,601	38,247	38,403
Livestock development - 901 PAN (counterpart funds)	-	-	440	690
Accumulated losses	<u>(1,097)</u>	<u>(1,796)</u>	<u>(1,721)</u>	<u>(2,182)</u>
Total	<u>22,997</u>	<u>25,805</u>	<u>36,966</u>	<u>36,911</u>
Total Liabilities and Net Worth	<u>30,798</u>	<u>48,009</u>	<u>58,161</u>	<u>57,794</u>

PANAMABanco de Desarrollo AgropecuarioCondensed Income Statements, 1973-76  
(US\$'000 equivalents)

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
<u>Revenue</u>				
Interest income	1,222	1,618	2,324	2,792
Property rentals	411	383	383	178
Property - profit on sales	28	18	21	4
Proceeds from sales of untitled land (MDA)	-	260	203	70
Other income	<u>65</u>	<u>85</u>	<u>105</u>	<u>298</u>
Total	<u>1,726</u>	<u>2,367</u>	<u>3,036</u>	<u>3,342</u>
<u>Expenses</u>				
Salaries and other personnel expenses	1,605	2,284	2,651	2,693
Depreciation	241	218	182	159
Other administrative expenses	<u>486</u>	<u>661</u>	<u>752</u>	<u>852</u>
Total administration expenses	<u>2,332</u>	<u>3,167</u>	<u>3,585</u>	<u>3,704</u>
Property administration expenses	132	131	208	57
Interest and commitment charges	278	676	721	1,480
Provision of portfolio losses	<u>81</u>	<u>186</u>	<u>244</u>	<u>284</u>
Total	<u>2,823</u>	<u>4,160</u>	<u>4,758</u>	<u>1,821</u>
Net income/(loss) exempt from taxes	<u>(1,097)</u>	<u>(1,796)</u>	<u>(1,722)</u>	<u>(2,183)</u>

ORTHO-PHOTOGRAPHIC EQUIPMENT LIST

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
1	Avioplan OR 1 comprendiendo: 1 unidad de proyección con portafotograma 1 tambor para película 1 carro de transporte 1 armario de electrónica 1 procesadora (8K) Nova 2/4 1 silla giratoria 1 juego de accesorios standard comprendiendo: 1 nivel 20", herramientas, material de reglaje, 10 lámparas de iodo-cuarzo 24 V/150 W, diversos programas y 8 dia- fragmas de ranura (5 x 0.1, 8 x 0.1, 12 x 0.1, 16 x 0.1, 5 x 0.3, 8 x 0.3, 12 x 0.3, 16 x 0.3)		124,910.
1	1 telescopio ASR 33, 115 V/200-240 V, 60 Hz		3,528.
1	registrador de cinta magnética para modo en "diferido"		7,098.
2	portafotograma con placa de recubrimiento	357.	714.
2	Aviógrafo 5 85 f = 152 mm con accesorios standard	25,116.	50,232.
	1 Aviógrafo 5 85 con soportes de cámaras f = 152 mm		
	1 accesorios standard		
2	juego de escalas de cristal, grupo 1, división métrica	378.	756.
2	pantógrafo lineal FPA 10 con mesa de dibujo y brazo polar	4,494.	8,988.
	1 pantógrafo lineal FPA 10 con engranajes intercambiables 1:1		
	1 mesa de dibujo PCT 1		
	1 brazo polar giratorio para pantógrafo lineal		
	1 standard accesorios para pantógrafo lineal		
1	par de soportes de cámaras f = 83.5 mm, para entregas posteriores		1,250.
1	microscopio para el carro porta-minas con marca anular Ø 0.4 mm, para FPA 10		69.
2	arcos de protección, plegables, para mesa de dibujo	130.	
1	juego de accesorios para el ajuste del 5 85 1 ocular auxiliar 1 anteojo de ajuste 1 regla calibrada para la distancia principal 1 nivel de 20" con placa intermedia		733.

<u>QUANTITY</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
2	equipo base de cinta magnética PEB 8 / PBK 8	24,146.	48,292.
	1 armario de la electrónica para PEB 8		
	1 juego de accesorios standard (fusibles, material diverso)		
	1 placa de recubrimiento para armario de la electrónica		
	1 dispositivo para la toma de coordenadas- imagen PBK 8		
	1 equipo de cinta magnética para utilizar con OR 1		
2	modificación para B 8S a partir del No. 3300 incluyendo PTL	10,109	20,219.
	1 juego de piezas de modificación PEB 8		
	1 Tri-Axis-Locator PTL		
	1 rueda dentada		
	1 juego de piezas de adaptación para Tri-Axis-Locator		
2	dispositivo de perfilaje asintot	1,050.	2,100.
1	equipo base EK 22		10,155.
	1 unidad electrónica EK 22 con visualización de 6 cifras y cable de red		
	1 interruptor de pedal		
1	numeración de los puntos, 16 cifras (8 cifras en la unidad electrónica y 8 cifras en el teclado completo)	2,388.	2,388.
	1 teclado completo		
	1 soporte para teclado completo		
1	panel de formato para cualquier formato, con 76 cables de programación, solamente EK 22		1,361.
2	juego de codificadores para B 8, B 8S, versión métrica	1,071.	2,142.
	2 codificadores (1270 ciclos)		
	1 codificador (250 ciclos)		
1	cable de conexión B 8S/EK 22, 4 m, 20 polos		189.
1	equipo para salida e introducción con máquina de escribir IEM mod. 731		5,258.
	1 máquina de escribir IEM mod. 731 con funda de protección, incluyendo modificaciones		
	1 circuito de mando para máquina de escribir IEM mod. 731, salida e introducción		
	1 cable de conexión 2.5 m, 40 polos de EK 22 a máquina de escribir		
	1 mesa de uso múltiple		
1	mesa rodante		172.
2	silla giratoria	122.	244.
	Total ex fábrica, incluyendo montaje, instrucción e viajes		291,058.
	CIF carga aérea Panama		8,942.
	<b>TOTAL CIF CARGA AEREA PANAMA</b>		<b>\$300,000.</b>

ANNEX II E  
Table 17

FARM MACHINERY EQUIPMENT LIST

MACHINERY EQUIPMENT	USEFUL LIFE	COST	ANNUAL % FOR SPARE PARTS	1979			1980			TOTAL		
				QTY	COST	COST SPARE PARTS	QTY	COST	COST SPARE PARTS	MACHINERY	SPARE PARTS	TOTAL
Tractors, 90 h.p. tires	5	19,800	15	7	138,600	20,790	3	59,400	8,910	198,000	29,700	227,700
Disc Plows	10	3,300	10	5	16,500	1,650	3	9,900	990	26,400	2,640	29,040
Disc Harrows	10	4,400	10	2	8,800	880				8,800	880	9,680
Seed drills, 14 rows, for rice	6	3,300	15	3	9,900	1,485	1	3,300	495	13,200	1,980	15,180
Seed planters, 4 rows, for sorghum and corn	6	4,600	15	2	9,200	1,380	1	4,600	690	13,800	2,070	15,870
Furrow opener	8	1,900	10	1	1,900	190				1,900	190	2,090
Cultivators, 4 row	8	3,600	10	3	10,800	1,080				10,800	1,080	11,880
Sprayers, 750 lts.	5	2,500	10	3	5,000	500				5,000	500	5,500
Mowers, 5'6" rotary	5	2,000	10	3	6,000	600	3	6,000	600	12,000	1,200	13,200
Fertilizer spreader	6	900	10	2	1,800	180				1,800	180	1,980
Broadcast seeders	6	800	10	2	1,600	160				1,600	160	1,760
Springtooth harrow, 15'	10	2,200	10	3	6,000	660				6,600	660	7,260
Thresher for cowpeas	6	5,500	10	1	5,500	550				5,500	550	6,050
Combine for rice and sorghum, 14 foot self-propelled	5	57,000	20	2	114,000	22,800				114,000	22,800	136,800
Pick up 4 wheel drive, equipped with tank and compressor.	6	9,000	10	1	9,000	900				9,000	900	9,900
<b>TOTALS</b>					<u>345,200</u>	<u>53,805</u>		<u>83,200</u>	<u>11,685</u>	<u>428,400</u>	<u>65,490</u>	<u>493,890</u>

WATERSHED MANAGEMENT AND REFORESTATION EQUIPMENT LIST

	<u>Quantity</u>	<u>Description</u>	<u>Unit</u>	<u>Total</u>
<b>A. REFORESTATION</b>				
	1	Irrigation system		25,000
	2	FWD Pick Ups	6,500	13,000
	1	Truck	14,000	14,000
	1	Small farm tractor	5,000	5,000
		Handtools		<u>5,000</u>
		Sub-Total		62,000
<b>B. FOREST CONSERVATION</b>				
	4	Radio Sets: for towers	4,000	16,000
	6	Portable	1,000	6,000
	2	FWD Pick Ups	6,500	13,000
	2	Metal tanks	250	500
	2	Centrifugal Pumps with acesories	2,000	4,000
	2	Portable Centrifugal Pumps	1,000	2,000
	2	Hose reels	250	500.
	200	Meters 3/4" high pressure hose with connections		1,600
	500	Meters. 1-1/2" canvas hose connections		1,250
	10	Back sprayers	80	800
	6	Back fire torches	50	300
	25	Hard hats	8	200
	3	Chainsaws	400	1,200
	1	Siren		50
	4	Motorcycles	1,000	4,000
		Handtools		<u>3,100</u>
		Sub-Total		55,000
<b>C. STREAMBED CLEANING</b>				
	1	Dump truck	13,000	13,000
	4	Chainsaws	400	1,600
		Handtools		<u>400</u>
		Sub-Total		<u>\$15,000</u>
		GRAND TOTAL		<u>\$132,000</u>

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ONION STORAGE FACILITY

Annex II E  
Table 19  
Page 1

Estimated Cost of Operations Based on a 15,000 cwts  
Module Assuming a 3 Module Complex in a Single Location

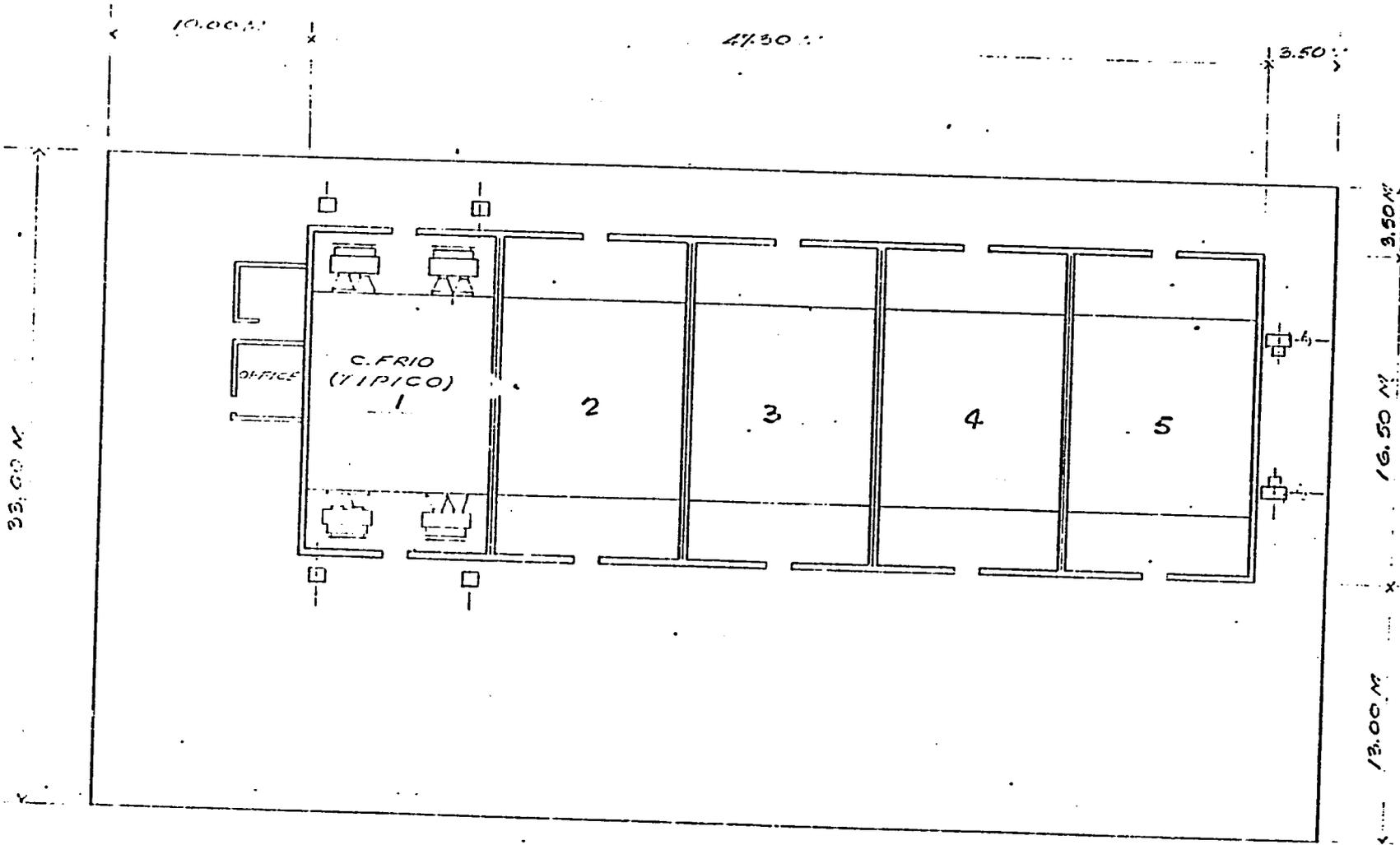
	Annual Cost	Seasonal Utilization Months	Modules	Per Module	Cost Per cwt. (15,000)
<u>Operating Costs</u>					
<u>Salaries and Wages</u>					
1 - Plant Manager/Operator	5,400	12	3	1,800	
1 - Assistant Operator	3,000	12	3	1,000	
1 - Refrigeration Technician	10,500	12	3	3,500	
1 - Fork-lift Operator	3,000	6	3	500	
1 - Janitor	1,000	12	1	1,000	
12- Graders/Packers	18,000	6	1	9,000	
2 - Watchman/Guard	2,400	12	3	800	
Total Salaries and Wages				<u>17,600</u>	<u>1.17</u>
<u>Plant</u>					
Fork-lift fuel and maintenance	4,800	6	3	800	
Repairs and Maintenance - Plant	4,500	12	3	1,500	
Supplies, Miscellaneous				1,200	
Utilities - \$12,500 per month		4	1	50,000	
Total Plant Costs:				<u>53,500</u>	<u>3.57</u>
<u>Depreciation</u>					
Building - 325,000 - 40 years	2 1/2%		1	8,125	
Machinery & Equipment - 125,000 20 years	5 %		1	625	
Fork-lift truck - 10,000 - 10 years	10 %		3	333	
Total Depreciation				<u>9,083</u>	<u>0.61</u>
<u>TOTAL OPERATING COSTS-PER MODULE</u>				<u>80,183</u>	<u>5.35</u>

\* Includes Payroll Taxes & Benefits

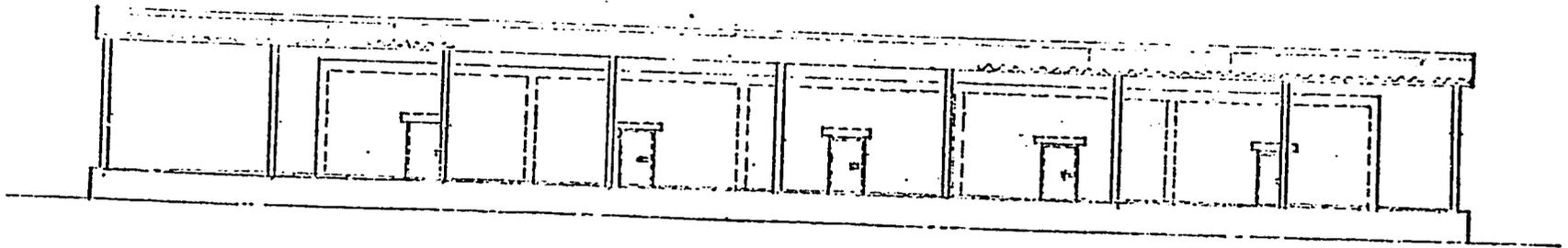
ONION PLANT

1. Building			
Roof & Columns	33 x 60.8 x 10.76 x 2.45	=	52,900.-
Floor, walls & foundation	524 Cu. Yd. at 100.-	=	52,400.-
			<u>105,300.-</u>
2. Insulation			
	sq. m.		
Complete Walls	1280 x 52.-	=	66,560.-
Ceiling	768 x 52.-	=	39,936.-
Floor			7,500.-
			<u>113,996.-</u>
3. Machinery & Equipment			
20 units - evaporators			63,460.-
40 units - air-cooled compressors			60,010.-
2 units - blower fans			2,000.-
Inland and ocean freight			21,790.-
			<u>147,260</u>
Equipment contingency - 10%			14,740.-
			<u>162,000</u>
installation			10,000.-
ducts			4,500.-
electrical work			14,000.-
			<u>212,500.-</u>
4. Site preparation			431,796.-
			10,000.-
			<u>441,796.-</u>
10% Contingencies			43,204.-
			<u>485,000.-</u>
Total. . .			<u>\$485,000.-</u>

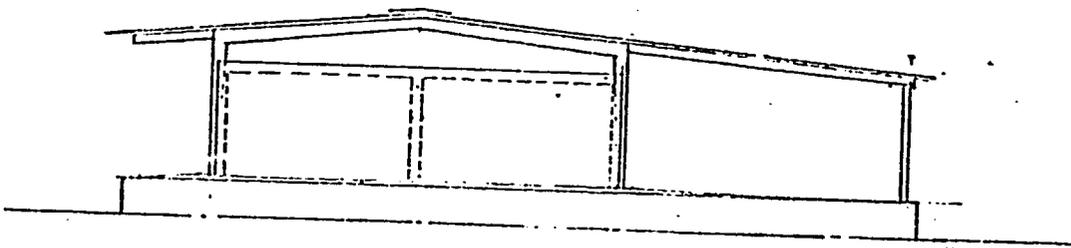
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ONION PLANT  
ESC. 12500



SIDE ELEVATION



END ELEVATION

Annex II E  
Table 19  
Page 4

ONION PLANT  
ESC 1:300

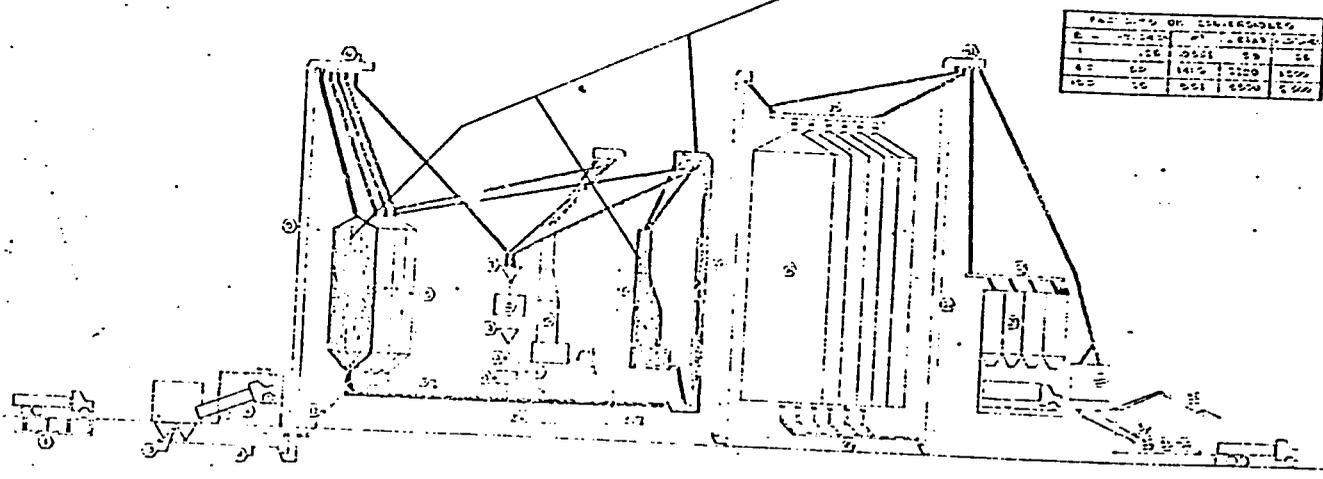
LISTA DE EQUIPOS

NO.	DESCRIPCION	CANTIDAD	VALOR UNITARIO	VALOR TOTAL
1	...	...	...	...
2	...	...	...	...
3	...	...	...	...
4	...	...	...	...
5	...	...	...	...
6	...	...	...	...
7	...	...	...	...
8	...	...	...	...
9	...	...	...	...
10	...	...	...	...
11	...	...	...	...
12	...	...	...	...
13	...	...	...	...
14	...	...	...	...
15	...	...	...	...
16	...	...	...	...
17	...	...	...	...
18	...	...	...	...
19	...	...	...	...
20	...	...	...	...
21	...	...	...	...
22	...	...	...	...
23	...	...	...	...
24	...	...	...	...
25	...	...	...	...
26	...	...	...	...
27	...	...	...	...
28	...	...	...	...
29	...	...	...	...
30	...	...	...	...
31	...	...	...	...
32	...	...	...	...
33	...	...	...	...
34	...	...	...	...
35	...	...	...	...
36	...	...	...	...
37	...	...	...	...
38	...	...	...	...
39	...	...	...	...
40	...	...	...	...
41	...	...	...	...
42	...	...	...	...
43	...	...	...	...
44	...	...	...	...
45	...	...	...	...
46	...	...	...	...
47	...	...	...	...
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LISTA DE EQUIPOS

NO.	DESCRIPCION	CANTIDAD	VALOR UNITARIO	VALOR TOTAL
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EL EQUIPO SOMBREADO SERA ADICIONADO A LA PLANTA DE AZUERO POR PRODIAR



FACTORES DE CONVERSION

UNIDAD	VALOR	UNIDAD	VALOR
1	...	...	...
2	...	...	...
3	...	...	...
4	...	...	...
5	...	...	...

DIAGRAMA DE FLUJO

<p>REVISADO</p> <p>...</p>	<p>PROYECTO PREPARADO POR</p> <p>FRECHER HARRIS ENG CORP</p> <p>SOLARIN CORP - Y PAUL DWYER &amp; ASSOCIATES</p> <p>ING CONSULTORES UNIDOS - ING PAN ASSOCIADOS</p>	<p>INSTITUTO DE MERCADEO AGROPECUARIO</p> <p>REPUBLICA DE PANAMA</p>	<p>...</p> <p>...</p> <p>...</p>
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SUPPLEMENTARY STATISTICAL PROFILE OF  
FARMS IN TONOSI, WITH SPECIAL REFERENCE  
TO TARGET GROUP

NOTE: This annex supplements and backs up information, data and analyses contained in Part III and in Annex V (Social Soundness Analysis).

## ANNEX II-F

Table 1

TONOSI: Number and Area of Farms by Tenure Status and Size, 1970

Farm Size (Hectares)	Number of Farms	Area (Hectares)	Average Size (Hectares)	Land Tenure							
				With Title				Without Title		Mixed	
				Farms		Area		Farms	Area	Farms	Area
				No.	%	Hect.	%				
Less than 3.0	575	659	1.1	46	8	46	7	1,037	417	130	196
3.0 - 4.9	124	448	3.6	9	7	29	6	91	306	32	113
5.0 - 9.9	89	560	6.3	2	2	11	2	71	441	17	108
10.0 - 19.9	147	1,967	12.8	2	1	31	2	137	1,738	15	198
20.0 - 49.9	345	11,025	30.3	26	8	777	7	306	9,258	30	990
50.0 - 99.9	300	20,277	66.7	10	3	688	3	263	17,237	31	2,352
More than 100	199	46,025	223.4	9	5	1,579	3	129	27,167	68	17,279
Total	1,779	80,961	32.9	104	6	3,161	4	2,034	56,564	323	21,236

SOURCE: Agricultural Census of 1971

## TONOSI: AREA OF PRINCIPAL CROPS BY FARM SIZE, 1970

(Hectares)

Farm Size (Hectares)	Annual Crops (1)							Perennial Crops					Pasture	Total Crops & pasture (Ha.)
	Rice	Corn	Beans	Cassava	Yam	Vegetables	Total (Ha.)	Coffee	Cane	Banana	Plantain	Total (Ha.)		
Less than 3.0	630	1,082	184	18	16	35	1,965	60	106	41	59	276	-	2,241
3.0 - 4.9	551	278	60	10	10	20	929	16	28	4	7	55	198	1,182
5.0 - 9.9	558	186	40	8	8	-	800	-	-	3	5	8	180	988
10.0 - 19.9	330	69	-	-	-	-	399	-	-	-	-	-	1,736	2,135
20.0 - 59.9	114	43	-	-	-	-	157	-	-	-	-	-	6,516	6,673
50.0 - 99.9	204	-	-	-	-	-	204	-	-	-	-	-	12,768	12,972
more than 100	-	-	-	-	-	-	-	-	-	-	-	-	26,267	26,267
Total	2,387	1,658	284	36	34	55	4,454	76	134	48	81	339	47,665	52,458

Source: Calculated on the basis of 1971 census data.

(1) NOTE: Rice, corn, and beans grown by farmers with less than 10 has. were in part share-cropped on land belonging to farmers in the other strata.

TONOSI: ESTIMATED VALUE OF PRODUCTION OF PRINCIPAL CROPS BY FARM SIZE, 1970

(Dollars, 1970 prices)

Farm Size (Hectares)	Total	Annual Crops						Perennial Crops			
		Rice	Corn	Beans	Cassava	Yam	Vege- tables	Coffee	Cane	Banana	Plan- tain
Less than 3.0	209,303	21,734	29,411	13,133	15,498	12,468	11,138	9,360	24,388	37,497	34,674
From 3.0 to 4.9	78,516	25,317	10,063	4,282	8,616	7,793	6,358	2,496	6,441	3,650	3,500
5.0 to 9.9	57,655	28,851	7,577	2,859	6,890	6,228	-	-	-	2,738	2,512
10.0 to 19.9	73,504	54,431	17,045	2,028	-	-	-	-	-	-	-
20.0 to 49.9	109,540	60,376	41,052	8,112	-	-	-	-	-	-	-
50.0 to 99.9	93,902	60,783	27,036	6,083	-	-	-	-	-	-	-
More than 100.0	44,818	22,739	18,024	4,055	-	-	-	-	-	-	-
Total	667,238	274,231	150,210	40,552	31,004	26,489	17,496	11,856	30,829	43,885	40,686

Source: Calculated on the basis of 1971 census data.

NOTE: Rice, corn and beans were allocated among the size groups in such a way as to allow for the assumed magnitude of share-cropping.

TONOSI: NUMBER OF FARMS WITH CATTLE BY SIZE OF FARM AND HERD, 1970

Farm Size (Hectares)	All Farms	Farms with cattle by size of herd									Farms without cattle
		Total	1-5	6-9	10-19	20-49	50-99	100-199	200-499	500 & more	
		N U M B E R O F F A R M S									
Less than 3.0	575	59	32	17	10	0	0	0	0	0	516
3.0 to 4.9	124	30	13	11	3	3	0	0	0	0	94
Sub-total	699	89	45	28	13	3	-	-	-	-	610
5.0 to 9.9	89	45	18	11	8	7	1	0	0	0	44
10.0 to 19.9	147	92	28	16	25	20	3	0	0	0	55
20.0 to 49.9	345	288	29	29	58	127	40	5	0	0	57
Sub-total	492	425	75	56	91	154	44	5	-	-	67
50.0 to 99.9	300	267	15	13	22	81	99	32	5	0	33
100 or more	199	185	2	0	8	18	43	66	38	10	14
Sub-total	499	452	17	13	30	99	142	98	43	10	47
Total: Number	1,779	966	137	97	134	256	186	103	43	10	813
Percent	100.0	54.3	7.7	5.5	7.5	14.4	10.5	5.08	2.4	.6	45.7

Source: Agricultural Census of 1971.

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ANNEX II-F

TABLE 5

## TONOSI: ESTIMATED VALUE OF LIVESTOCK PRODUCTION BY FARM SIZE, 1970

(Dollars, 1970 prices)

Farm Size (Hectares)	Chickens			Cattle			Pigs	All Livestock
	Meat	Eggs	Total	Meat	Milk	Total		
Less than 3.0	34,708	22,237	56,945	--	--	--	--	56,945
3.0 - 4.9	3,763	2,411	6,174	10,731	1,388	12,119	--	18,293
5.0 - 9.9	2,593	1,662	4,255	9,709	1,255	10,964	5,961	21,180
10.0 - 19.9	4,433	2,840	7,273	93,513	12,093	105,606	10,134	123,013
20.0 - 49.9	20,741	13,289	34,030	351,057	45,398	396,455	49,180	475,665
50.0 - 99.9	17,396	11,145	28,541	688,062	88,979	777,041	83,755	889,337
More than 100.0	--	--	--	1,401,930	181,295	1,583,225	--	1,583,225
Total	83,634	53,584	137,218	2,555,002	330,408	2,885,410	149,030	3,171,638

SOURCE: Calculated on the basis of 1971 census data.

TONOSI: NUMBER OF FARMS THAT SOLD AGRICULTURAL PRODUCTS  
BY SIZE OF FARM AND AMOUNT OF SALES, 1970

Farm Size (Hectares)	Total	Sales in Dollars				
		Less than 100	100-200	200-500	500-1000	1000 and more
		N U M B E R				
Less than 5	515	414	62	30	8	1
5 to 50	419	156	60	96	54	53
50 to 100	220	43	15	42	38	82
100 and more	171	19	7	15	21	109
Total	1325	632	144	183	121	245
		P E R C E N T				
Less than 5	100	80	12	6	2	--
5 to 50	100	37	14	23	13	13
50 to 100	100	20	7	19	17	37
100 and more	100	11	4	9	12	64
Total	100	48	11	14	9	18

Source: Agricultural Census of 1971.

TONOSI: Estimated Availability and Requirements  
of Farm Labor, by Tenure Strata

<u>Farm Size</u> (has.)	<u>Families</u> (No.)	<u>Available Labor</u> (Thousand man-days)	<u>Labor Requirement</u>	<u>Surplus or Deficit</u> { -}
No land or less than 10	912	319	85	+ 234
10 - 19.9	147	51	43	+ 8
20 - 49.9	345	121	113	+ 8
50 - 100	300	105	135	- 30
More than 100	<u>199</u>	<u>70</u>	<u>188</u>	<u>- 118</u>
TOTAL	1,903	666	564	+ 102

1/ Calculated at 1.52 workers per family and 230 days per year per worker.

Source: Estimated from census data and on the basis of assumed labor requirements of specific lines of production under prevailing technology.

## TONOSI: Legal Status of Landholdings by Corregimiento, April 1976

Corregimiento	Land with Private Title			Public Domain				Total Area Has.	
	Parcels	Owners	Area	Occupied		Unappropriated	Total		
	No.	No.	Has.	Parcels	Occupants	Area	Has.		
Tonosí	29	16	770	91	65	1,992	358	2,350	3,120
El Bebedero	67	52	3,033	140	96	6,304	2,233	8,537	11,570
Florès	33	20	998	203	139	11,538	-	11,538	12,536
El Cacao	39	24	1,551	200	132	5,879	-	5,879	7,430
Altos de Guera	35	28	1,862	238	170	9,300	1,356	10,654	12,516
El Cortezo	27	19	1,061	139	90	4,477	9,362	13,839	14,900
La Tronosa	4	4	187	302	207	9,615	338	9,953	10,140
Cañas	35	29	1,794	352	256	9,433	2,053	11,486	13,280
Guánico	36	22	2,286	413	252	13,608	31,806	45,414	47,700
Sub-Total	305	214	13,542	2,078	1,407	72,146	47,504	119,650	133,192
Unidentified	20	19	670	-	-	-	-	-	670
T O T A L:	325	233	14,212	2,078	1,407	72,146	47,504	119,650	133,862

Source: MIDA, DGRA.

TONOSI: Landholdings of Individual Owners or Occupants  
by Size Class and Legal Status, April 1976

Size Class (Has.)	Owners with Title			Occupants of Public Land		
	No.	Area (has.)	Average Size (has.)	No.	Area (has.)	Average Size (has.)
<u>A) DISTRICT TOTAL</u>						
Less than 1	-	-	-	193	76	0.4
1 - 10	12	80	6.5	313	1,346	4.3
11 - 20	32	538	16.8	146	2,229	15.3
21 - 30	34	909	26.3	122	3,234	26.5
31 - 50	42	1,660	39.6	181	7,492	41.4
51 - 200	87	8,451	96.1	385	37,494	97.4
More than 200	7	1,904	265.0	67	20,275	302.6
TOTAL:	214	13,542	61.8	1,407	72,146	51.3
<u>B) CORREGIMIENTO TONOSI</u>						
Less than 1	-	-	-	14	5	0.4
1 - 10	4	26	6.5	22	95	4.3
11 - 20	1	16	16.0	6	94	15.7
21 - 30	3	80	26.6	8	234	29.3
31 - 50	3	129	43.0	5	213	42.6
51 - 200	5	519	103.8	8	703	87.9
More than 200	-	-	-	2	648	324.0
TOTAL:	16	770	48.1	65	1,992	30.6
<u>C) CORREGIMIENTO EL BEBEDERO</u>						
Less than 1	-	-	-	6	2	0.3
1 - 10	1	6	6.0	21	74	3.5
11 - 20	13	205	15.8	11	183	16.6
21 - 30	8	206	25.7	5	130	26.0
31 - 50	11	444	40.4	14	537	38.3
51 - 200	17	1,640	96.5	31	3,072	99.1
More than 200	2	532	266.0	8	2,302	287.7
TOTAL:	52	3,033	58.3	96	6,304	65.6

Size Class (Has.)	Owners with Title			Occupants of Public Land		
	No.	Area (has.)	Average Size (has.)	No.	Area (has.)	Average Size (has.)
D) FLORES						
Less than 1	-	-	-	17	6	0.4
1 - 10	-	-	-	15	74	4.9
11 - 20	2	35	17.5	7	117	16.7
21 - 30	7	186	26.6	10	274	27.4
31 - 50	1	31	31.0	22	1,003	45.6
51 - 200	10	746	74.6	53	5,174	97.6
More than 200	-	-	-	15	4,890	326.0
TOTAL:	20	998	49.9	139	11,538	83.0
E) EL CACAO						
Less than 1	-	-	-	16	8	0.5
1 - 10	1	4	4.0	47	196	4.2
11 - 20	1	20	20.0	15	235	15.6
21 - 30	5	143	28.6	2	55	27.5
31 - 50	6	242	40.3	15	582	38.8
51 - 200	11	1,142	103.8	31	3,196	103.1
More than 200	-	-	-	6	1,607	267.8
TOTAL:	24	1,551	64.6	132	5,879	44.5
F) ALTOS DE GUERA						
Less than 1	-	-	-	13	7	0.5
1 - 10	2	16	8.0	29	148	5.1
11 - 20	3	48	16.0	19	269	14.2
21 - 30	2	53	26.5	24	636	26.5
31 - 50	9	368	40.9	22	904	41.1
51 - 200	12	1,377	114.8	58	5,658	97.6
More than 200	-	-	-	5	1,678	335.6
TOTAL:	28	1,862	66.5	170	9,300	54.7
G) EL CORTEZO						
Less than 1	-	-	-	13	4	0.3
1 - 10	-	-	-	20	84	4.2
11 - 20	7	133	47.6	9	134	14.8
21 - 30	2	45	22.5	5	141	28.2
31 - 50	4	146	36.5	12	472	39.3
51 - 200	5	470	94.0	28	2,826	100.9
More than 200	1	267	267.0	3	816	272.0
TOTAL:	19	1,061	56.4	90	4,477	49.7

Size Class (Has.)	Owners with Title			Occupants of Public Land		
	No.	Area (has.)	Average Size (has.)	No.	Area (has.)	Average Size (has.)
H) <u>LA TRONOSA</u>						
Less than 1	-	-	-	30	14	0.5
1 - 10	-	-	-	43	199	4.6
11 - 20	-	-	-	21	333	15.9
21 - 30	1	24	24.0	19	478	25.2
31 - 50	2	73	36.5	36	1,450	40.2
51 - 200	1	90	90.0	51	4,793	94.0
More than 200	-	-	-	7	2,348	335.4
TOTAL:	4	187	46.8	207	9,615	46.4
I) <u>CANAS</u>						
Less than 1	-	-	-	42	8	0.19
1 - 10	4	28	7.0	69	251	3.64
11 - 20	4	65	16.25	31	430	13.87
21 - 30	4	114	28.50	27	674	24.96
31 - 50	4	139	34.75	25	971	38.84
51 - 200	12	1,234	102.83	55	5,101	92.74
More than 200	1	214	214.0	7	1,998	285.4
TOTAL:	29	1,794	61.86	256	9,433	36.85
J) <u>GUANICO</u>						
Less than 1	-	-	-	42	22	0.5
1 - 10	-	-	-	47	225	4.8
11 - 20	1	16	16.0	27	434	16.1
21 - 30	2	58	29.0	22	612	27.8
31 - 50	2	88	44.0	30	1,360	45.3
51 - 200	14	1,233	188.1	70	6,967	99.5
More than 200	3	891	297.0	14	3,988	284.9
TOTAL:	22	2,286	104.0	252	13,608	54.0

Source: MIDA, DGRA.

## TECHNICAL ANALYSIS -- ROAD IMPROVEMENT

A. The Current Road Network

The district seat of Tonosí is at present connected with the provincial capital of Las Tablas and other population centers via two asphalt roads running northeasterly and northwesterly from the town. These, together with a link running from the northeast route to Cañas total 43 km of hard surface roads within the district. The IDB is financing a 41 km virtually completed paved extension of the Cañas link that will end at Pedasi. Only 6 km of the road will lie in the Tonosí District but it will provide an alternate route to Las Tablas. Another 25 km of asphalt road which will go southwest from Tonosí to the coastal village of Cambutal is under construction with IDB financing; this road - to be completed in 1979 - will be very important for the development of the high-potential Guánico Valley which has no all-weather road at present. All-weather gravel or select material roads total 21 km at present. Approximately 70% of the district's existing network - 14.1 km - consists of earth surfaced roads (Table 1).

B. The Road Transport Problem and Proposed Solution

An analysis of existing soils, cadastral, and population data shows that most of the land that has the best potential for resettlement of project participants is currently served only by earth surfaced roads. These roads lack adequate drainage and are passable only by four-wheel drive vehicles during much of the rainy season. The lack of an all weather road network is a principal deterrent to the expansion of agricultural production in the Tonosí district and hence to project success. In the corregimientos of Guánico and Altos de Guera, for example, the output of milk declines substantially during the rainy season when it increases greatly in other areas - because corregimientos become inaccessible to the milk trucks.

To overcome this severe constraint on agricultural development and to enhance the probability of success of other project activities it is proposed to upgrade to all weather standards 12 road segments totalling approximately 80 kilometers by the end of the 1979 dry season. A list of the proposed road segments showing the estimated cost for each segment and the year the segment will be improved is shown in Table 2. This road network appears sufficient at this time to service all project participants (see Table 3). Total estimated cost of upgrading the network is \$1,600,000. This figure includes a 10% general contingency reserve and a 12% annual inflation factor.

In addition to the road segments proposed for improvement, six alternate road segments have been studied which could be built should one or more of the former not prove feasible in designing the operational plans for years 1 and 2. However, preliminary analysis indicates that these alternatives may show a relatively low benefit cost ratio for the project. They are:

- 1. Macaracas Highway - Espavejito (8 km);
- 2. Flores - Joaquin Arriba (4.5 km);
- 3. Palmitas - Jobero ( 5 km);
- 4. Tonosí - Bebedero (2 km);
- 5. Puerto Piñas Road (5.5 km);
- 6. Tonosí - Madre Vieja (2 km).

C. Road Selection Criteria

The candidate roads were chosen on the basis of the following criteria:

- 1. Agricultural Potential. - The road must serve agricultural areas with substantial potential for annual or perennial crops or improved pasture.
- 2. Target Group. - The road must serve a significant number of priority project participants. The number considered significant cannot be defined precisely but will remain a matter of judgment for PRODIAR and USAID staff in approving final selection of roads. A minimum average density of five participant families per kilometer has been established as a guideline. The roads selected are within those areas that are expected to have the largest concentration of priority participants as a result of land redistribution.
- 3. Benefit Incidence. - Since road improvement is intended to benefit primarily project participants, the majority of the projected net benefits attributed to a road segment (see Annex II) must accrue to participant families.
- 4. Existing all-weather network. - The road segment must connect to an all-weather road.
- 5. Technical Feasibility. - All candidate roads must undergo a final engineering review to assure that proposed improvements are technically feasible at a reasonable cost.

C. District Road Network. - While definite priority will be given to roads meeting primarily the above criteria, accessibility to social services, medical clinics, agricultural extension service offices, schools, etc. will also be taken into consideration. However, it may become necessary to upgrade one or two road segments primarily because of their importance as a service link in the overall district road network rather than because of their agricultural potential as defined by the selection criteria.

All roads selected for improvement during year 1 meet the above criteria. Once actual locations for resettlement of project participants have been identified, each road segment to be improved in year 2 will be subjected to a simplified benefit-cost analysis by PRODIAR utilizing the methodology presented in Annex II.

#### D. Road Construction Standards and Costs

The construction standards which have been selected reflect the minimum standards of the Ministry of Public Works for all-weather roads. These standards will support trucks with up to 18,000 pound axle loads.

The improved roads will follow the present alignment of existing roads wherever feasible in order to reduce costs and minimize soil erosion. The basic layout and alignment will be commensurate with the requirements for future improvements to higher standards. The road surface will be 5 meters wide on a 6 meter platform with 50 cm deep ditches on each side. Surfaces will have a 15 cm thick layer of gravel or select material which is readily and freely available in streambeds, some of them very close to the construction sites. Where existing fences limit the width of the right-of-way, both the road platform and surface will be 3 meters wide, with 50 cm deep drainage ditches on each side. In a further effort to keep costs low, in view of the reduced traffic expected in the short run, streambed crossings will be provided by fords wherever feasible. However, field reconnaissance has disclosed that the topography and swelling of certain streambeds during heavy rains require the building of approximately 16 bridges. These bridges will range from single lane concrete structures, 5 to 15 meters long, to one-way cable suspension bridges, 25 to 60 meters long. Table 4 contains more detailed specifications of road construction standards. Figure 1 represents a cross-section of a typical road segment.

Three basic types of road improvement have been identified in accordance with the topography and other conditions of the candidate

roads. Their average cost per kilometer excluding structures (at 1977 prices) is estimated at \$8,000, \$13,000 and \$19,000, respectively, as follows:

<u>Type 1</u>	<u>Per/Km</u>
Ditching and fine grading of roadbed	\$ 1,500
Concrete pipe culverts	2,500
Surfacing with select materials to 15 cm thickness	<u>4,000</u>
<b>Total</b>	<b>\$ 8,000</b>
 <u>Type 2</u>	
Minimum earth movement	\$ 5,000
Ditching and fine grading of roadbed	1,500
Concrete pipe culverts	2,500
Surfacing	<u>4,000</u>
<b>Total</b>	<b>\$13,000</b>
 <u>Type 3</u>	
Maximum earth movement	\$11,000
Ditching and fine grading of roadbed	1,500
Concrete pipe culverts	2,500
Surfacing	<u>4,000</u>
<b>Total</b>	<b>\$19,000</b>

The estimated cost per linear meter for all bridges is \$1,000 and for fords, \$500. The overall cost per kilometer of road including structures is approximately \$20,000. This compares with a price of \$170,000 per kilometer for a contract awarded under the IDB-financed rural roads project for a double bituminous surfaced treatment road from Tonosí to Cambutal.

E. Construction Phasing

During 1978 all access roads will be constructed in Zone I along with one road (Búcaro intersection to Ostional) in Zone III.

This will allow participants scheduled for 1978 resettlement to begin production in 1979. Improvement of the remaining roads (located basically in cattle areas) will be completed during 1979. Completion of all road construction during 1978 - while it would have been physically possible would lead to a needlessly capital intensive construction effort owing to the absence of a large pool of unemployed in the area. It would also prevent making the more detailed benefit/cost analysis mentioned in C above.

F. Adequacy of Organizational Structure and Technology

Road improvements will be constructed under the direction of the Ministry of Public Works (MOP) through its National Directorate of Construction (DNC). The regional director of MOP will implement the program in consultation with the Area Coordinator of the project. Most of the work will be performed through local private contractors.

A sub-division within the DNC - the Special Projects Department - will have primary responsibility for overseeing the improvement of the routes selected. It will prepare designs, cost estimates and bid documents, and supervise and inspect construction. The unit has the required experience and capacity. (The personnel of this Department constitute 42 percent of the total DNC staff of 213).

The MOP itself employs some 2,700 persons. Its headquarters are in David, and it operates through nine divisional offices, one of which is located in Las Tablas. These divisions are headed by a Division Engineer who has a small administrative staff. Each has its own warehouse for parts and materials, maintenance and repair shops for heavy equipment, and does both road construction and maintenance. In theory each division has separate staff for road maintenance and construction. However, in actual practice, staff members and equipment are loaned from construction to maintenance and vice versa. Repairs for both maintenance and construction equipment are done in the same shop, and fuel is drawn from the same tanks. This practice provides a highly desirable flexibility in the use of crews, equipment and funds. All plans and cost projections will be carefully reviewed by USAID engineers prior to initiating work.

The possibility of implementing the road improvements program through the municipio of Tonosí (i.e., district government) was evaluated but was discarded because its administrative capacity is not sufficient to permit completion of the program in two years. The DNC, on the other hand, has had wide experience in all aspects of highway construction and maintenance. Between 1970 and 1975 it built and improved 1,470 km of national highways, with a total investment of \$52 million.

In view of the scale of the works to be constructed, it is expected that contracts will be awarded to one or more local firms or to one or more of the six foreign firms doing business in Panama, three of which are from the U.S. and the others from Peru, Ecuador and Mexico. Due to the small amounts involved (generally less than \$500,000 per contract), and the dispersed and isolated nature of the work, contracts are not expected to attract any off-shore interest and therefore will not be advertised in the U.S.

The contracts for the road improvements will require maximum feasible employment of unskilled local labor. This will apply particularly to masonry, ditching, culvert excavation, and spreading of gravel. However, in order to complete the road construction program by 1979, and in view of relatively high labor costs, the absence of a large pool of unemployed in the area, and the seasonality of the work, major earth-movement, grading, shaping and surfacing will be performed by road equipment. Construction of culvert headwalls and fords will be contracted by the DNC with the municipio of Tonosí and/or the corregimiento representatives in order to assure that labor intensive methods will be utilized. The DNC will provide technical assistance.

G. Road Maintenance

In order to make maintenance more responsive to local needs and conditions, and to involve the communities more closely in development, road maintenance will be the responsibility of the municipio of Tonosí. The municipio, with assistance from the representative of the Corregimientos has recently initiated an active and successful, through limited, road maintenance program. The municipio has acquired a front end loader and three dump trucks (two of which were financed through the AID-financed Municipal Development Loan - FODEM). In order to provide adequate maintenance of the roads to be up-graded under this project, two more dump trucks, one 4-wheel drive pickup and one motor grader would be added to this equipment, possibly through Reconditioned Excess Property. The equipment would be maintained by the Project's farm machinery maintenance facility operated by the Empresa Nacional de Maquinarias Agrícolas (ENAMA).

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Road maintenance expenses have been included in the GQP counterpart contribution of the project's financial plan that will provide adequate funds for the life of the Loan. They will be budgeted annually, specifically for maintenance of Project Roads, at an estimated cost of \$200 per year per kilometer.

In order to stimulate community participation and create constructive employment opportunities during the slack season, the Area Coordinator and the municipio will study the feasibility of employing village labor on an annual basis by means of fixed price contracts with local communities to maintain a given section of road. Maintenance would include the cutting of side vegetation, the cleaning of side ditches and culverts, and the repair of potholes and ruts with select material and stone. MOP in conjunction with the Municipio would provide technical assistance through a superintendent who is an expert in managing light road equipment.

ANNEX III  
Table 1

SUMMARY OF ROAD NETWORK IN TONOSI DISTRICT,  
BY CORREGIMIENTO, IN KILOMETERS.

(1977)

Corregimiento	Paved or Gravel Surface	Earth Surface	Total
Tonosí	4.1	18.8	22.9
Altos de Guera	8.8	2.5	11.3
Cañas	11.2	8.1	19.3
El Bebedero	11.8	45.1	56.9
El Cacao	11.5	0	11.5
El Cortezo	0	8.5	8.5
Flores	10	0	10
Guánico	0	38	38
La Tronosa	6.5	19.5	26
Total	63.9	140.5	204.4

TONOSI: LIST OF ROADS TO BE IMPROVED

AND ESTIMATED COST

No.	ROAD SEGMENT	Length		Estimated unit cost, 1977		Total Estimated cost each, 1977		Estimated total cost for the roads & bridges at the year of execution including escalation of 12% a year plus 10% contingency.			
		Road (Km)	Bridge (Mt)	Road Per Km	Bridge Per Mt	Road	Bridge	1978		1979	
								Roads	Bridges	Roads	Bridges
ZONE 1											
A.	BUENOS AIRES										
	1. Intersection Cambutal Road-Buenos Aires	5	-	8000	-	40000	-	49300	-	-	-
	3 Concrete bridges	-	15 mts.c/u	-	1000	-	45000	-	55450	-	-
	1 Concrete bridges	-	10 mts.c/u	-	1000	-	10000	-	12300	-	-
	1 Ford	-	6 mts.c/u	-	500	-	3000	-	3700	-	-
	2. Buenos Aires-Bijaguales	8	-	13000	-	104000	-	128150	-	-	-
	1 Ford	-	5 mts.	-	500	-	2500	-	3100	-	-
	3 Concrete bridges	-	15 mts.c/u	-	1000	-	45000	-	55450	-	-
B.	RIO VIEJO ABAJO										
	1. Intersection Puerto Road-Rio Viejo	5.5	-	8000	-	44000	-	54200	-	-	-
	2. Rio Viejo-Rio Viejo del Solar	3.0	-	8000	-	24000	-	29550	-	-	-
	1 Suspension Cable bridge	-	25 mts.	-	1000	-	25000	-	30800	-	-
	Sub-total page	<u>21.5</u>	-	-	-	-	-	<u>261200</u>	<u>160800</u>	-	-

TONOSI: LIST OF ROADS TO BE IMPROVEDAND ESTIMATED COST

No.	ROAD SEGMENT	Length		Estimated unit cost, 1977		Total Estimated cost each, 1977		Estimated total cost for the roads & bridges at the year of execution including escalation of 12% a year plus 10% contingency.					
		Road (Km)	Bridge (Mt)	Road Per Km	Bridge Per Mt	Road	Bridges	1978		1979			
								Roads	Bridges	Roads	Bridges		
C.	MADRE VIEJA												
	1. Rio Viejo del Solar- R.V. de las Rodriguez	2	-	19000	-	38000	-	46800	-	-	-	-	-
	2. Macaracas Highway- La Limona 2 Fords	5	-	13000	-	65000	-	80100	-	-	-	-	-
		-	10 mts.c/u	-	500	-	10000	-	12300	-	-	-	-
D.	JOAQUIN ARRIBA												
	1. El Cacao-Joaquín Arriba 2 Concrete bridges 1 Ford 1 Ford	8.5	-	13000	-	110600	-	136150	-	-	-	-	-
		-	15 mts.c/u	-	1000	-	30000	-	36950	-	-	-	-
		-	8 mts.	-	500	-	4000	-	4950	-	-	-	-
		-	6 mts.	-	500	-	3000	-	3700	-	-	-	-
	ZONE II												
E.	CORTEZA/TRONOSA												
	1. Intersection La Pintada -El Cortezo 1 Concrete bridge 1 Suspension cable bridge 1 Ford	9	-	8000	-	72000	-	-	-	99350	-	-	-
		-	15 mts.	-	1000	-	15000	-	-	-	-	20700	-
		-	60 mts.	-	1000	-	60000	-	-	-	-	82800	-
		-	6 mts.	-	500	-	3000	-	-	-	-	4150	-
	Sub-total page	<u>24.5</u>						<u>263050</u>	<u>57900</u>	<u>99350</u>	<u>107650</u>		



TONOS1: Estimated Availability of Land for Resettlement and Projected Number of Participant Families to be Resettled Along Access Roads

ANNEX III  
TABLE J

Zone/Sub-Project Area/ Road Segment	Length (Kms.)	Area of Influence (Hag.)			Hectares Available for Resettlement			Projected Number of Participant Families			Families Per Linear Kilometer
		CA 1/	CP 2/	Total	CA	CP	Total	CA	CP	Total	
<b>ZONE I</b>											
<b>A. Buenos Aires</b>											
1. Intersection Cambutal Road to Buenos Aires	5	400	500	900	60	180	240	17	9	26	5
2. Buenos Aires-Bijaguales	8	1000	1000	2000	510	420	930	146	21	167	21
Sub-Total	13	1400	1500	2900	570	600	1170	163	30	193	15
<b>B. Rio Viejo Abajo</b>											
1. Intersection Puerto Road to Rio Viejo	5.5	1100	-	1100	270	-	270	77	-	77	14
2. Rio Viejo-Rio Viejo del Solar	3	400	-	400	60	-	60	17	-	17	6
Sub-Total	8.5	1500	--	1500	330	-	330	94	-	94	11
<b>C. Madre Vieja</b>											
1. Rio Viejo del Solar-R.V. de las Rodriguez	2	450	200	650	150	90	240	43	6	47	24
2. Macaracas Highway - La Limona	5	700	200	900	270	120	390	77	6	83	17
Sub-Total	7.0	1150	400	1550	420	210	630	120	10	130	19
<b>D. Joaquin Arriba</b>											
1. El Cacao-Joaquin Arriba.	8.5	200	1200	1400	80	420	500	22	21	43	5
<b>ZONE II</b>											
<b>E. Cortosa/Tronosa</b>											
1. Intersection La Pintada-El Cortoso	9	200	1300	1500	120	780	900	30	26	56	6
2. Intersection El Cortoso Road to La Tronosa	3	50	750	800	-	480	480	-	16	16	5
3. Macaracas Highway-La Pintada	15	300	1200	1500	120	1120	1440	30	44	74	5
Sub-Total	27	550	3250	3800	240	2380	2820	60	86	146	5
<b>ZONE IV</b>											
<b>F. Guanico</b>											
1. Bucare Road to Ocasional	6	350	1800	2150	150	1020	1170	42	51	93	16
2. Ave Maria - Guanico Abajo	9	1200	950	2150	300	360	660	85	18	103	11
Sub-Total	15	1550	2750	4300	450	1380	1830	127	69	196	13
<b>ZONE I, II, AND III</b>											
<b>G. Along Existing All-Weather Roads</b>											
	(43)	600	4200	4800	240	2160	2400	68	81	149	(4)
<b>TOTAL</b>	<b>79</b>	<b>8930</b>	<b>15300</b>	<b>22250</b>	<b>2330</b>	<b>7350</b>	<b>9680</b>	<b>654</b>	<b>297</b>	<b>951</b>	<b>12</b>

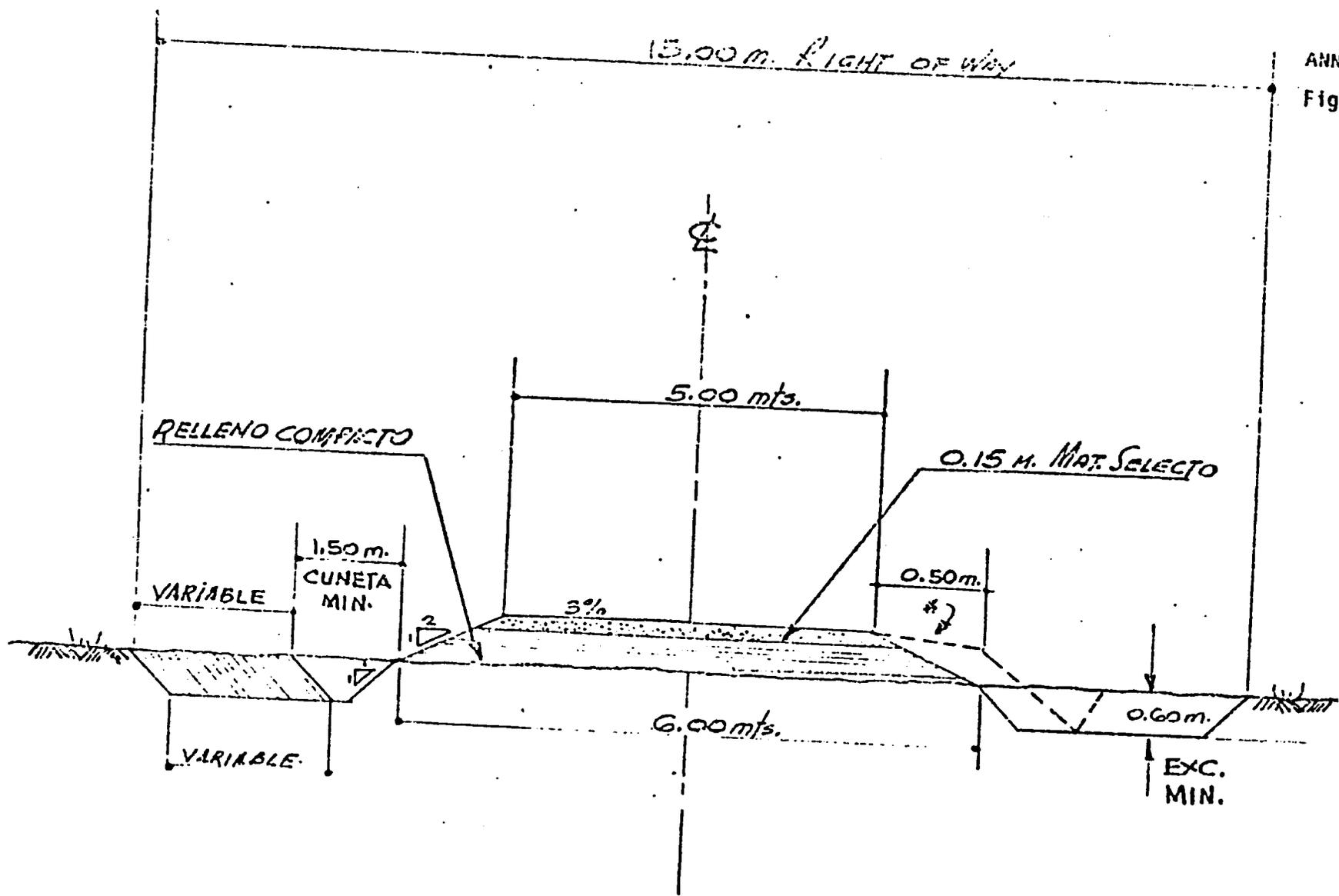
1/ Crop land. 2/ Grazing land.

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ANNEX III  
Table 4

DETAILED ROAD IMPROVEMENT STANDARDS

Right-of-way:	15 meters
Roadbed:	5 meters
Surface :	15 cm. of compacted select material or gravel from nearby rivers.
Side Slopes:	Maximum of 1:1 cut, 1-1/2: 1 on fill, with flatter slopes where field soil conditions indicate.
Grades:	Maximum of 10% with 15% along selected short sections.
Alignment:	Follow existing alignment as practicable for minimum earth movement and maintain a minimum radius of horizontal curvature of 40 meters.
Compaction of Road:	90% Field Density. ASSHO Standard
Drainage:	
Side Ditches:	Minimum of 0.50 m deep 1 m wide at top, slopped for drainage on flat road grades.
Culverts:	Reinforced-concrete pipe, min. 24" diam. with headwalls
Streambed Crossings:	Will be provided by fords where practicable.
Bridges:	As needed, will range from single lane concrete bridges 5 to 15 mts. cyclopean concrete abutments and concrete beams and slabs to single lane cable suspension bridges, 25 to 60 mts. with steel beams and wood decks, designed for H-15 Loading.
Crown:	The roadbed and surfacing along tangents will be crowned and horizontal curves superelevated to a cross slope of 3%



TYPICAL SECTION  
FEEEDER ROAD

\* When New Construction 0.50m shoulders will be constructed.

WATERSHED MANAGEMENTA. INTRODUCTION

The Tonosi River watershed is characterized by migratory agricultural and ranching activities and by indiscriminate cutting of trees and burning of forest and brush cover in the upper areas of the watershed. The destruction of the forest cover has resulted in the deterioration of soils (both erosion and leaching), and has increased the frequency and severity of flooding in lower valleys during the rainy season. Much of the originally forested hillside lands has now been denuded because of indiscriminate cutting and burning by small farmers and ranchers. Thus, the abundant rains that fall between May or June and December cause periodic flooding, with particularly severe floods occurring once every three years.

The result is a rapid decline in the productivity of soils on hillsides and in the valleys which, if left unchecked, will seriously affect the area's long-term potential for cultivation and cattle grazing.

Reversal of the process of land degradation requires a concerted, comprehensive watershed management program. This program will protect and rehabilitate the Tonosi watershed through activities which will lead to the upgrading and/or conservation of forest, water and soils resources in the project area.

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## ANNEX IV

### Page 2

A successful watershed management program for Tonosf requires as its first priority an effective control over the present method of indiscriminate cutting and burning of trees in the upper reaches of the watershed, particularly in the La Tronosa forest preserve. The introduction of proper silviculture practices and an accelerated reforestation program will assist in restoring the forest cover on presently degraded lands and will return lands to their best use from a long-run ecological standpoint.

Watershed management has multiple objectives; it is not merely oriented toward the production of forest products. Forests maintain productivity of the soil and reduce the rate of water run-off. They also provide employment and incomes for the rural population in forest related activities at a low opportunity cost. Forestry and agriculture in the Tonosf District are interrelated and complementary. Recuperation of degraded soils is deemed possible only through reforestation (see E 1 below).

The watershed management program for Tonosf comprises three specific elements: (1) Conservation and management of soils and waters; (2) forest management and utilization; and (3) forest conservation. The first element includes the implementation of soils, hydrologic and forest studies as well as river-bed cleaning. The second includes reforestation, seed production and pilot forest product utilization activities. The third consists mainly of forest fire prevention.

**B. DESCRIPTION <sup>1/</sup>**

The Tonosf District watershed is situated on the southern tip of the Azuero Peninsula adjacent to the Pacific Ocean.

More than 80% of the Tonosf watershed is composed of mountainous lands with steep broken slopes and deep drainage cuts. Drainage of the watershed is toward the Pacific Ocean. The foothills comprise an area of 5% to 20% slopes composed of residual soils with broken topography. An alluvial plain extends from the base of the foothills to the ocean, but with small remnants of residual materials scattered throughout the flood plain. Three rivers, Tonosf, Viejo and Limón cross the watershed. The Tonosf river has a drainage area of 747 km<sup>2</sup>, Viejo river drains 68 km<sup>2</sup> and Limón river drains 192 km<sup>2</sup> approximately.

Originally the watershed was covered with tropical jungle forest, but the slash and burning to promote the growth of native grasses for cattle and for primitive agriculture has greatly changed the hydrological conditions of the watershed (see Annex VI, Map 9). Today even small rains cause considerable transport of sediments through the drainage system. Though sedimentation has not been measured, it is evident that the hydrological equilibrium can be improved considerably through reforestation and other means of soil conservation and water control.

<sup>1/</sup> See Part II, Project Background, for further physical description of area.

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The Tonosf River enters into the flood plain approximately 28 km. from the ocean. From this point on the river bed is not sufficiently wide or deep to carry the annual flood waters. Since ocean tides rise to an up-river distance of 6 km., the capacity of the channel is further reduced during high tides. (Median tide level is 1.6 meters.) Local reports indicate that floods have recently occurred every year for short periods, and that serious flooding took place in 1959 and again in 1973, when the flood level crossed the dividing lines between the three rivers causing intermingling of the waters. (The flood waters receded after two days.) In the village of Tonosf, with a population of 494 in 1970, floods completely covered the built-up area to a height of 30-60 cm. in the majority of the buildings. Only the church and some homes nearby escaped the waters. Other villages and buildings in the flood plain suffered similar damage during these floods.

C. ORGANIZATIONAL STRUCTURE

To assure coordinated implementation of the activities of this component, an efficient and functional organization will be set up under the Tonosf District RENARE<sup>1/</sup> coordinator who will in turn report to the Project Area Coordinator.

The RENARE coordinator will directly coordinate and control all component activities and maintain liaison with the Project Area Coordinator and with the national Director and specialized staff of RENARE.

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<sup>1/</sup> For a brief institutional analysis of RENARE, see Part IV D.

In addition, the RENARE staff will consist of an agricultural engineer, responsible for overall management of the watershed, administration of water resources, streambed cleaning and soil mapping, and of a forest engineer and a forest technician in charge of fire control, reforestation and pilot forest products utilization. Five laborers will be permanently employed in these activities.

D. FOREST CONSERVATION

Most fires are a result of slash-and-burn agricultural activities (see above and Part II, Project Background). While it is expected that most of the subsistence farmers will be incorporated as project participants and resettled in the lower areas of the valley, temptation will continue to exist for some slash-and-burn activities by new migrants from other districts. The best method to control fires caused by these activities for Panama has been found to be recruiting, training and equipping local people as forest guards for fire detection and fighting. By educating them in the value of forests and forest cover, they are led to protect their woodland against encroachment by others at very low financial cost.

Fire control towers will be constructed and fire-fighting equipment will be purchased.

E. REFORESTATION

1. Background

Reforestation activities are considered to be an important element of the integrated rural development effort for two main reasons:

## ANNEX IV

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First, reforestation efforts on the higher slopes of the watershed are an essential, positive measure to reverse the process of soil degradation and erosion in the watershed in conjunction with the elimination or substantial reduction in cutting and burning and discontinuation of cultivation and/or grazing activities on steep hillsides. Letting the land revert to natural brush cover is not considered to be a practical alternative because (a) some of the slopes are too badly degraded to regenerate enough vegetation without artificial intervention and (b) the local population will respect their own tree plantations but not natural brush cover.

Secondly, reforestation is an economically productive activity which can take place on land with little or no alternative economic value. The opportunity cost of the lands to be reforested is minimal from a long-run social point of view. <sup>1/</sup> And, at the low opportunity cost of labor, even at \$3 per day, reforestation with commercially valuable species is an economically viable activity in Tonosf (see (5) below).

Of the 63,000 hectares of actual and potential forest land in the Tonosf watershed, 21,000 hectares require reforestation. It is anticipated that in the five years of the project, a minimum of 1,500 hectares can be planted with species of commercial value. Experience shows that as the operation becomes more efficient locally, unit costs decline. Thus, the goal may well be exceeded (see (4) below).

<sup>1/</sup> Although it is valuable in the short run to individuals as subsistence crop or pasture land, the high long-run cost to society in the form of soil degradation and erosion as well as flooding are ignored by such individuals.

## 2. Description of Project Activities

The sub-project contemplates a permanent program which will plant approximately 500 hectares annually. The project consists of planting and caring for seedlings in upper watershed areas of commercially valuable species of trees to be selected on the basis of their impact on soil and water conservation, their adaptability to local soil and climate, their value and their maturity age. Once the plantations have been established, RENARE will employ proven silviculture management practices to ensure the growth of quality trees and high survival rates. RENARE personnel will select priority areas for reforestation, devise a seed collection mechanism, establish nurseries, and supervise land preparation and planting of seedlings. Approximately 90% of the area will be reforested with Caribbean Pine. Eucalyptus, Gmelina Arborea, and other species will also be planted. Climatic conditions, topography and soil characteristics will determine the precise mix of species planted.

## 3. Costs

Table 1 summarizes investment, technical assistance, overhead, and direct costs for a five year reforestation program. These costs amount to \$988,000 for reforestation of 1,500 hectares, including \$705,000 of direct costs of planting and maintaining this acreage during the 5 year project period. Additional plantation maintenance and harvesting costs between years 6 and 24 are detailed in Table 6 which presents a

benefit-cost analysis of the project.

4. Direct Reforestation Costs

Direct costs for reforestation amount to \$445 per hectare for the initial planting and an additional \$1,070 over 20 years for maintenance and harvesting. A detailed breakdown of these costs is shown in Tables 2 and 3.

The \$445 per hectare is based on experience gained in reforestation activities in various regions of Panama. However, it is expected that this cost can be reduced in the 4th and 5th year of the project as the manual workers become more experienced, as has occurred in the plantations at "La Yeguada" (see Table 4).

5. Economic Appraisal of the Reforestation Sub-Project

This component is analyzed as a separate element of the Tonosf Project to show that it is economically feasible by itself, i.e., even without factoring in of other economic and social benefits, quantifiable and non-quantifiable.

The direct economic benefits of the project are considered to be the increase in income generated from the sale of lumber. They will occur in the first instance to the State, which will plant 1,500 hectares of forest.

Because forest development is a long-term venture (17-25 years from planting to final harvest for Caribbean Fine and Melini, given the favorable growing conditions in Tonosf), this component

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is analyzed on the basis of a 20 year planting to harvest cycle,<sup>1/</sup> i.e., on the basis of a 25 year total project life.

For analytical purposes it is assumed that there are 3 thinnings and a final harvest in years 7, 12, 17, and 20 subsequent to planting.

The harvest (thinning) in year seven is primarily to clean out 25% - 35% of the plantation trees <sup>2/</sup>; however, the wood has some value as fuel and possibly fence posts. A nominal value of 25¢ per harvested tree has been estimated for these uses.

The utilization of the second harvest (thinning) is for utility poles which currently have a farm gate value of \$20-40 per pole depending on the size.<sup>3/</sup> This harvest is scheduled to occur in year 12. However, given the favorable growing conditions in Tonosf, some trees could be harvested in year 8. Approximately 25% or 200 trees are harvested at this stage.

The third harvest takes place in year 17. This harvest provides saw logs. At this time there is a total growth (conservatively estimated) of 340 m<sup>3</sup> or 68,000 board feet per hectare. The current farmgate price per board foot of wood in Panama is 15¢. It is assumed that 200 trees or 1/2 of the volume of wood existing in year 17 is harvested. The estimated value of this harvest is \$6,100 per hectare.

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<sup>1/</sup> Other species which will be planted in these mixed forests include teak (50-200 year maturity) and mahogany and cedar (30-40 year maturity).

<sup>2/</sup> An average of 1,100 seedlings per hectare are planted; however, not all of them survive. For purposes of analysis it is assumed that an average of 800 per ha. actually grow.

<sup>3/</sup> This compares with a present import price of \$100 for treated wooden poles.

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The remaining trees can be harvested from year 18 to 25 depending, primarily, on market conditions. During this period the annual growth per hectare is on the average 20 m<sup>3</sup> or 8,000 board feet; in year 20, 42,000 board feet are harvestable with a value of \$6,300/hectare.

#### 6. Appraisal

The reforestation sub-project is viable from an economic standpoint. The financial internal rate of return is 20% over a 24 year project life (see Table 5). This calculation is based on a procedure which measures gross value of production against all monetary costs incurred. Although it is not an economic IRR it is considered to be a close proxy for this value.

As noted above, the land involved in reforestation activities (except for nurseries) is considered to have no alternative productive use (socially as well as economically). Hence the opportunity cost for land is negligible. Manual labor, which represents one-quarter of the direct planting and maintenances cost, has not been shadow-priced because most labor during the initial planting phase will be required during the same months of the year that crops are being planted. Professional and technical personnel, equipment and material inputs (seedlings, fertilizers, pesticides) in any case would be valued at their market price.

On the benefits side, the gross value of production, i.e., the revenues received at the farm-gate, are the only readily quantifiable

benefits. As mentioned above, reforestation will positively contribute to flood reduction through more regular stream flows and more generally to the long-run ecological balance of the Tonosf watershed; however, it is difficult to estimate the incremental contribution of a reforestation program over a program of taking the land out of use and permitting natural regeneration. This additional benefit has not been quantified. Nor have employment or income redistribution effects been quantified but it should be noted that the project will generate 18,000 man-days annually of employment when it is fully underway (assuming 500 has. new plantings per annum). In sum, reforestation is an economically justifiable investment, in addition to its essential contribution to the improvement of Tonosf watershed's ecological balance. In addition, it will benefit the rural poor of the Tonosf district by offering an opportunity for part time employment to a significant percentage of the economically active population in the area - including neighboring districts - during the life of the project or for as long as the GOP continues a reforestation program in the area.

F. FOREST PRODUCTS UTILIZATION PILOT PROJECTS

Two possible pilot projects have been identified for forest products utilization:

1. Lumber Production

Lumber production in Panama has to date utilized only approximately ten native species considered to have commercial value.

An additional 30 species of trees appropriate for lumber, although found in natural forests, are not being utilized for lack of a local or export market. In the future it will be necessary to commence using new forest species since accessible stands of the prime species such as "cedar", mahogany and "oak" are nearly exhausted.

The economic use of secondary value forest species will be promoted through utilization demonstrations over an area of about 10,000 hectares, oriented essentially towards local demand for forest products of the population in the watershed and adjacent areas, such as fence posts and construction. A small portable sawmill would be located according to log availability.

## 2. Pyrolytic Forestry Waste Conversion Pilot Project

The continuous inflation in the price of imported petroleum products in Panama, especially for propane gas, which is used extensively in urban and rural homes, has aroused interest in the possibility of locally produced substitutes. Pyrolytic<sup>1/</sup>conversion of forestry wastes into charcoal, pyrolytic oils and gas, is a promising alternative source of energy. Conversion of wood into charcoal in earth-mound kilns is an ancient process. Current charcoal production activities use inexpensive easily constructed batch process kilns. Recovery of gas and pyrolytic oils can be obtained by modifying the pyrolytic conversion to a continuous process at low cost.

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<sup>1/</sup> Pyrolysis is chemical decomposition by heat.

A modest sum will be set aside for the installation of either a batch process or continuous flow kiln to demonstrate the feasibility of utilizing "waste" from secondary forest species found in the existing natural forests of the Tonosf watershed to commercially produce charcoal and/or pyrolytic oils. (It is also possible to use other materials such as rice husks to produce charcoal and oils.) Because the technical feasibility has been demonstrated elsewhere <sup>1/</sup>, the primary objective is to test economic feasibility, especially local market acceptance of charcoal and pyrolytic oils as substitute fuels for cooking, and (in the case of oils) lighting of homes as well as for drying of grains.

Charcoal production would commence as a small scale demonstration project. This sub-project will be experimental and serve as a demonstration of the use of secondary forest species in the higher elevations, wood scraps from lumber operators in the Azuero, and perhaps rice husks. In addition, if it is ecologically feasible to selectively harvest material from the coastal mangrove forests, this material can also be used for charcoal production.

#### G. CONSERVATION AND MANAGEMENT OF SOILS AND WATERS

A reversal of the decline in soil fertility and of the severe soil erosion which is occurring in the Tonosf watershed will require inter alia a carefully planned multiple use soils and water management program. The objectives of this program are:

<sup>1/</sup> See "Pyrolytic Conversion of Agricultural and Forestry Wastes in Ghana - A Feasibility Study". By Tze Chang, et al; Georgia Institute of Technology.

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1. To better manage, control and maintain use of soil and water resources;
2. to attain a better water balance;
3. to reduce flooding and silting of both residential areas and agricultural lands;
4. to regulate the use of water for agriculture, industry and household consumption;
5. to make detailed recommendations for ecologically optimum land use.

These objectives are to be achieved through completion of geologic, soils, hydrologic, and climatic studies which will permit rational long-term land use planning, and through physical actions such as streambed cleaning.

In addition, control of water use from rivers, and eventually water pumping, will also be implemented under the technical supervision of RENARE personnel, under the terms of Decree Law No. 35 of 23 September 1966, as supplemented by recently drafted regulations which will be applied experimentally in Tonosf for the first time.

Planned activities include:

1. Hydrologic Study 1/

Successful long-term development of the Tonosf watershed must be based on an adequate knowledge of the potential availability of

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1/ To be contracted with IRHE, the public water resource and electric power company which has the technical capability.

water as well as soil resources. The feasibility of expanding irrigated farming in the longer-term (post-project), through the construction of water storage and/or by tapping aquifers via tube-wells, can accurately be determined only if accurate data on rainfall and groundwater are collected.

At present climatological statistics for Tonosf are very scarce, especially for higher elevations. No long-term data exist on the seasonal flows of the rivers. Available data indicate only that the major discharges occur in August to December, with the greatest discharge in November and that in the past 58 years there have been 18 serious floods in the Tonosf valley. No ground water study has been done but indications are that it may well be abundant.

In order to accurately assess irrigation water availability for the project and beyond, as well as to adequately plan for flood control, the hydrologic study will include evaluations of rainfall, evaporation, evapotranspiration, soil filtration and surface and subterranean water flows. The end result will be the existence of adequate technical data for long-term planning of agricultural, industrial and household water uses.

## 2. Soils Inventory

Based on the aerial photography to be provided by the cadastral updating, existing information and additional sampling where required, a soils inventory will be prepared by the end of 1978 which will permit detailed land use planning on the farms of

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project participants, for other farmers, and for soil conservation and reforestation activities. The soil samples, to be gathered by project area personnel, will be sent to MIDA's soils laboratory at Divisa for analysis. The information will be mapped under the responsibility of RENARE.

### 3. Streambed Cleaning

Clearing of debris from streambeds will require an original equipment investment of \$15,000 and annual expenditure of \$16,000 for a paid local work team to clear 70 kilometers of stream and river beds. After year 5 of the project, the local communities will be expected to maintain streambeds free of debris with voluntary labor.

The objective of the streambed cleaning is to clear major obstructions such as logs, branches and boulders from the streambed in order to permit a more rapid flow of water, especially during periods of heavy rainfall. The improved drainage capability of the watershed's streams will help reduce the severity of the flooding which occurs in the district.

ANNEX IV  
Table 1

REFORESTATION SUB-PROJECT  
COST SUMMARY

YEAR	FIXED COSTS					VARIABLE COSTS			
	CONSTRUCTION	INVEST. EQUIP.	COSTS VEHICLES	PERMANENT PERSONNEL	FUELS & LUB.	AREA HAS.	INITIAL PLANTING*	PLANTATION MAINTENANCE	TOTAL COSTS
	D O L L A R S					D O L L A R S			
1	11,000	35,000	27,000	21,000	5,000	0	4,000	0	103,000
2				21,000	5,000	100	49,000	0	75,000
3				47,000	6,000	300	127,000	4,000	184,000
4				47,000	6,000	500	221,000	13,000	287,000
5				47,000	6,000	600	263,000	23,000	339,000
	11,000	35,000	27,000	183,000	28,000	1,500	664,000	40,000	988,000

\* Includes some nursery costs and maintenance cost for initial year.

ANNEX IV  
Table 2

REFORESTATION COSTS PER HECTARE

Reforestation and Production Costs, per hectare considering a plantation rotation of 20 years.		Activities
<u>Year</u>	<u>Cost per hectare</u> (Dollars)	
1	445	Planting and Maintenance
2	40	Maintenance and Supervision
3-4	10	Maintenance and Supervision
5-6	20	Pruning, Maintenance and Supervision
7	200	Harvest (1st thinning), Maintenance
8-11	20	Maintenance and Supervision
12	200	Harvest (2nd thinning), Maintenance and Supervision
13-16	20	Maintenance and Supervision
17	250	Harvest (3rd thinning), Maintenance
18-19	10	Maintenance and Supervision
20	300	Final Harvest
<b>TOTAL:</b>		
	1,515	

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Breakdown of Initial Planting and Preparation Costs

	<u>Cost per hectare</u> <u>(Dollars)</u>
a. Manual Work	
Clearing and land preparation	130
Linking and staking	10
Holing	20
Fertilizing	5
Distribution of plants	8
Planting	<u>20</u>
SUB-TOTAL	193
b. Materials and Plants	
Plants	116
Fungicides/insecticides	15
Fertilizers	<u>20</u>
SUB-TOTAL	151
c. Construction and Maintenance of	
Forest roads	55
d. Maintenance of the Plantation	35
e. Transport of plants	<u>11</u>
SUB-TOTAL	<u>101</u>
TOTAL COST	445

ANNEX IV  
Table 4Comparative Man/Day Output Record in Reforestation at La Yeguada\*

ACTIVITY	OUTPUT YEARS			
	1970	1972	1974	1975
Staking	780	1,611	1,790	2,205
Holing	368	509	612	683
Distribution of plants	445	565	679	1,050
Fertilizing	1,221	2,390	2,558	2,909
Planting	422	509	650	740

\* Note: To plant a seedlings 5 distinct operations are required - staking, holing, plant distribution, fertilization and planting. This table reflects the average number of times one man could repeat each of these operations in one day based on work records of the La Yeguada Plantation. Labor productivity for each operation increased every year.

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ANNEX IV  
Table 5

Tonosf Reforestation -- Benefit Cost Summary  
(\$1,000)

<u>Year</u>	<u>Sales Volume</u>	<u>Project Costs</u> <sup>1/</sup>	<u>Undiscounted Net Benefit</u>	<u>Discounted Net Benefit (20%)</u>
1	0	103		
2	0	75	(103)	(86)
3	0	184	(75)	(51)
4	0	287	(184)	(106)
5	0	339	(287)	(138)
6	0	58	(339)	(136)
7	0	39	(58)	(19)
8	5	57	(39)	(11)
9	15	111	(52)	(12)
10	25	133	(96)	(19)
11	30	157	(108)	(18)
12	0	39	(130)	(16)
13	400	48	(39)	(4)
14	1,200	91	352	33
15	2,000	136	1,109	87
16	2,400	157	1,864	121
17	0	39	2,243	121
18	510	52	(39)	(2)
19	1,530	103	458	17
20	2,550	155	1,427	44
21	3,690	212	2,395	62
22	1,890	123	3,478	77
23	3,150	177	1,767	39
24	3,780	207	2,973	45
			3,573	46

<sup>1/</sup> Project costs for years 6-24 include direct and overhead costs for maintaining and harvesting the plantation as well as replacement costs for vehicles and equipment.

ANNEX IV  
Table 6

Tonosf Reforestation Benefits

<u>Year</u>	<u>Volume Harvested</u>	<u>Unit Value</u>	<u>Total Sales Volume</u>
1	0		
2	0		0
3	0		0
4	0		0
5	0		0
6	0		0
7	0		0
8	20,000 trees	0.25	0
9	60,000 "	0.25	5,000
10	100,000 "	0.25	15,000
11	120,000 "	0.25	25,000
12	0		30,000
13	20,000 "	20.00	0
14	60,000 "	20.00	400,000
15	100,000 "	20.00	1,200,000
16	120,000 "	20.00	2,000,000
17	0		2,400,000
18	3,400,000 board feet	0.15	0
19	10,200,000 " "	0.15	510,000
20	17,000,000 " "	0.15	1,530,000
21	24,600,000 " "	0.15	2,550,000
22	12,600,000 " "	0.15	3,690,000
23	21,000,000 " "	0.15	1,890,000
24	25,200,000 " "	0.15	3,150,000
			3,780,000

SOCIAL SOUNDNESS ANALYSIS1. General Considerations

The social soundness analysis presented here is based on several lengthy analyses which addressed the fundamental social and cultural issues inherent in the undertaking of this regional approach to rural development. These analyses, by anthropologists, a social psychologist and a sociologist are, in turn, based on available historical information, first-hand observations in the Tonosí region, materials and interviews with the PRODIAR staff and prior research conducted in Tonosí. Unfortunately, all documents maintained at the regional capital prior to 1972 had been destroyed; moreover, few sociological or anthropological investigations have ever been conducted in Tonosí. Where appropriate, research findings on similar social phenomena in adjacent or comparable districts are included.

2. Brief Historical Sketch

The present social structure of Tonosí, comprising somewhat distinct, yet interdependent, strata of ranchers and farmers, has been shaped by a series of historical trends. Lacking, until 1965, a serviceable road connecting with the provincial seat, Las Tablas, the Tonosí district has traditionally been isolated.

It was colonized relatively late by cattle ranchers. Migration from various parts of Los Santos province intensified in the 1960's, resulting in an extremely heterogeneous population.

Between 1924 and 1950, the greater part of Tonosí's most fertile land was held by the Tonosí Land Company, a subsidiary of the United Fruit Company. The company gradually purchased most of the peasants' lands between 1924 and 1930 disrupting the traditional social structure and causing the relocation of the native population. A brief description of the company's activities some fifty years ago explains in part, the unique socio-economic configuration found in Tonosí today.

The company's activities between 1924 and 1930 involved the arrival in Tonosí of a substantial, culturally alien labor force, as well as a number of American managerial and technical personnel. More important, the company's land purchase operations completely disrupted the traditional land tenure pattern. By cleverly spreading the false rumor that the Government would expropriate any lands that were not voluntarily sold to the company, and paying what at

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Page 2

that time were very generous prices for both land and cattle, the company managed to acquire more than one-fourth of the land in the District. Only a few ranchers, who through political connections in the Capital were able to ascertain the speciousness of the Government threat, refused to sell out.

The world depression persuaded the United Fruit Company to cease all further investments in 1930. No bananas were ever produced in Tonosí. With demand for both agricultural produce and labor from the metropolitan area depressed by the world economic situation, the area reverted to traditional cattle ranching and subsistence farming. Nevertheless, the United Fruit Company retained control over the 36,000 hectares it purchased until 1950, at which time they were returned to the public domain; again, only a handful of politically well-connected persons were aware of this. During the intervening years small ranchers from neighboring areas had gradually been acquiring rights to small parcels of land from campesinos (who had been granted a sort of cropping "license" by the United Fruit Company's caretaker), and expanding their operations from that base.

The grave economic dislocations resulting from the depression of the 1930's had serious repercussions in Panama. During this time, few people from Tonosí migrated from the region, for employment opportunities in the urban areas of the Transit Zone (Panama and Colón) were scarce. Migration of males to the Transit Zone during World War II was common, however, for the construction of Canal defense installations yielded many jobs.

Beginning around 1950, the traditional geographical and social isolation of the district began to be broken by a combination of the entrance of well-connected cattlemen from neighboring Los Santos district, wise enough to lay claim to a good part of the lands newly reverted to the public domain 1/ and the introduction of air passenger and freight service.2/ The district continued to be

1/ According to local informants, at least 10 years passed before the local campesinos were fully aware that the United Fruit Company had in fact returned the land to Panama.

2/ The roundtrip to Panama City cost \$34.00 at that time, obviously beyond the reach of the majority of the population; the high freight cost contributed neither to the possibility of marketing local produce nor to lowering the cost of inputs and consumer goods in the district.

sparsely populated until the 1960's. Population had not even doubled between 1898 and 1940, when it reached a total of 2,645.

Tangible changes came to Tonosí beginning in 1965, when the first all-weather road to the outside world (to Las Tablas via Macaracas) was opened. This naturally attracted a substantial number of both slash-and-burn campesinos and cattle ranchers in search of virgin, unoccupied land. In recent years colonization of Tonosí has been mainly by large cattlemen, who have rapidly been acquiring most of the land occupied by small peasant farmers and cattlebreeders.

### 3. Analysis of the Existing Social Structure

The population of Tonosí can be divided into six broad social strata or classes. Five of the six depend directly on the land - through either farming or cattle-breeding - for their livelihood. The sixth, representing approximately 14% of the economically active population, is composed mainly of a growing number of individuals engaged in such activities as commerce, teaching and transportation.

At the top of the local stratification system are the cattlemen. Three groups or types of cattlemen can be distinguished, based on the size of their ranches. There is a small (3%) group of cattlemen with very large ranches or latifundia. As a rule they do not live in Tonosí but in Las Tablas, the provincial capital, where they also tend to engage in secondary activities, usually commerce (such as dry goods stores) or act as cattle middlemen. As large-scale merchants they operate on an extensive credit system which serves to maintain their economic control of the local social structure. Within the last two decades, their ranks have been enlarged by the inflow of professionals (physicians, veterinarians and lawyers, to name a few) who, upon graduating from the university, initiate their activities in Las Tablas and later invest their earnings in acquiring land and cattle, eventually becoming "latifundistas" themselves. To their credit, however, is the fact that they tend to be the most technologically innovative groups of all. This is a result of their access to higher education and greater degree of contact with the outside world as well as their access to the necessary capital.

A second type of cattlemen, perhaps 15% of the economically active population, is composed of those ranchers who own between 50 and 200 hectares. Although they are located in the district itself, they tend to live in the small towns which are "cabeceras de corregimiento" such as Tonosí, Cañas, Guánico, etc. Besides ranching, they also frequently engage in parallel economic activities such as commerce and the operation of "cantinas" and small rice huskers

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Page 4

(piladoras de arroz). As is the case with the latifundistas, the middle-size cattlemen employ these services to extend credit to poorer strata of the local population, hence holding a certain amount of economic power over them.

Poor cattlemen with small ranches constitute a stratum to which some 20% of the economically active population belong. They represent by far the largest group of cattlemen in Tonosí. In this category are to be found some 600 producers whose farms vary between 5 and 50 hectares, with a median size of 30 hectares. In spite of its numerical size, this stratum is actually in the process of social disintegration, mainly for economic reasons: extensive, primitive cattle breeding is not economically feasible anymore on such a small scale. Cattlemen who belong to this category are confronted with the alternatives of adopting technological innovations or selling their farms to larger more modern operators and migrating. Some migrate to other virgin regions now being colonized, others to the towns, where they try to engage in petty trade, investing the earnings from the sale of their cattle and property.

Poor or small cattlemen are tradition-minded, a fact explainable partially by their very low educational level (usually not higher than first or second grade of elementary schooling), and by their intermittent contact with outside institutions. Because of their precarious situation within the socio-economic structure, they are considered a priority within the project. Great care must be exercised in introducing innovations, however, because of this group's cautiousness in dealing with outside institutions, official or private. Technological innovations are accepted by this stratum, e.g., the case of dairy farming, after a period characterized by a "wait and see attitude", during which time poor cattlemen follow closely how the technological innovator is faring. This pattern of behavior is understandable in view of the small margin for error with which the poor cattleman operates. The risk in innovating is larger for him than for those in the higher strata.

The farmers of Tonosí (agricultores campesinos), with less economic power and social prestige than the ranchers, can be divided into two groups: the "minifundistas" (peasants owning less than 5 hectares of cropland) and the landless peasants. Both of these groups fall within the project's target population.

With 45% of the economically active population, the stratum of minifundia owners is, by far, the largest of all of Tonosí's social strata. Because they do not have sufficient land for cattle breeding, they depend mostly on subsistence agriculture and wage labor to meet family needs. The rapid growth of their

numbers is due to the pauperization process affecting small cattlemen. In corregimientos where larger farms have been expanding by absorbing smaller ones, there are no occupational opportunities within the area. Minifundistas who lose their land seek employment as wage laborers in medium and large-sized cattle ranches. As ranchhands their job usually involves pasture maintenance (limpieza de potreros) and building or repairing wire fences. A wealthier cattleman always utilizes an employment system called "ajuste" whereby he sets up a contract with a trusted minifundista ("de su confianza") who in turn agrees to execute the task for a stipulated amount of money. In turn, the minifundista goes out and subcontracts with other peasants to work for him. These men are chosen as a rule along kinship or ritual kinship lines.

As usual in a traditional or transitional latifundio/minifundio structure, economic and social relations among the various classes are fairly well defined. Formalized evidence of the necessary relations among people of differing classes are the many family ties that often transcend the class structure. The mutual interdependence of the upper and lower classes is evident primarily in the structure and composition of the labor market, where the subsistence farmers and landless farm workers serve as a pool of day labor that is contracted by the larger ranchers for the jobs requiring least skill such as weeding pasture, repairing fences, etc.

Mutually beneficial economic relationships between farmers and cattlemen, and among cattlemen, are numerous and complex. As indicated earlier, an additional interdependence in the past has been the traditional arrangement between subsistence slash-and-burn farmers and cattlemen. In addition to "voluntary" arrangements by which the subsistence campesino would turn over to a cattle rancher a piece of public land cleared, farmed and then seeded to pasture, middle-size and large cattle ranchers often contract informally with subsistence farmers the clearing of land which the former have already claimed. In these cases the "owner" usually collects between one-fourth and one-half of the crop from a campesino and demands that the land be seeded to pasture at the end of the contract. Such an arrangement actually represents a high capitalization of campesino labor in favor of the cattlemen, who would, by-and-large, not be in a position to pay prevailing cash wages for land clearing and pasture establishment. An additional dimension of the class interdependence is that between the middle-sized and large cattlemen, where the former receive a certain number of cattle from the latter to run on their pastures on a kind of half-share basis, in lieu of bank credit (see below).

Significant social changes in Tonosí's social structure have occurred as a result of its increased integration with the

national economy in recent years. For example, traditional forms of mutual aid and labor exchange are rapidly disappearing and are being replaced by wage labor.

The number of landless agricultural laborers has increased steadily from a handful of families without land a few decades ago to constitute today, a pressing social problem. No one can really be precise about the number of families of landless peasants in Tonosí, although estimates range from 100 to 200 families. They tend to congregate along the valley's roadsides, and many farm subsistence plots belong to wealthier relatives or compadres, sharing one-half of their production with the land's owner.

In recent years, the intensification of a dual social trend has characterized the evolution of social classes in Tonosí. On the one hand, there has been a gradual concentration of land in the hands of large cattlemen; in a parallel development, repeated subdivision of small parcels of land has increased the number of minifundistas and landless peasants. These latter two groups provide the bulk of Tonosí's wage labor force.

#### 4. Socio-economic Characteristics of Tonosí

The effects of increasingly accessible education through the national school system are readily observed in Tonosí. Not only has the rate of illiteracy declined, but higher levels of education have apparently resulted in higher social and economic expectations. Today most parents consider education indispensable, and try as much as possible to further their children's education. Another effect of the increased number of children attending school has been a reduction in the availability of household labor. The head of the household must now depend more on wage laborers for agricultural tasks, rather than on children. The desire for higher education is also a major factor in migration, for growing numbers of young peasants move to Las Tablas or Panama City to continue their secondary and even university education. The traditional educational system never imparted to students a love for land or agriculture, but the vocational and agricultural approach of the new Ciclo Básico system is designed to provide both a basic education and agricultural skills to children in rural areas like Tonosí.

Tonosí, like the rest of Los Santos Province, is a region where the people have traditionally adhered to the political and ideological premises of the Liberal party. Among their beliefs is the conviction that every individual should have inalienable property rights, and that he should be free to dispose of his property as he pleases. A man's right to his plot is respected by

sparsely populated until the 1960's. Population had not even doubled between 1898 and 1940, when it reached a total of 2,645.

Tangible changes came to Tonosí beginning in 1965, when the first all-weather road to the outside world (to Las Tablas via Macaracas) was opened. This naturally attracted a substantial number of both slash-and-burn campesinos and cattle ranchers in search of virgin, unoccupied land. In recent years colonization of Tonosí has been mainly by large cattlemen, who have rapidly been acquiring most of the land occupied by small peasant farmers and cattlebreeders.

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Table of Contents

Page 5, Chart IV A-1 - TONOSI: Growing Season for Principal Crops Under Project.

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Page 49, Paragraph 3, line 3, read: inputs: qualitatively and ...

Page 50, Paragraph 2, line 4, read: to MIDA's Directorate of Sectorial Planning and by the one-year ...

Page 56, Paragraph 2, line 6, read: The project will finance the procurement of farm ...

Page 58, Paragraph 1, line 2, read: e.g. domestically produced seed as well as fertilizer, ...

Page 58, Paragraph 4, line 8, read: from these two official institutions. Purchases may also be made ...

Page 64, Paragraph 3, line 2, read: mapping of the 1967 cadastral survey. as explained in Part II.

Page 79, Paragraph 3, line 4, read: established by setting up several typical ...

Chart IV A-1 - TONOSI: Growing Season for Principal Crops Under Project. For "Manioc", read "Cassava".

Page 83, Paragraph 1, line 6, read: roads and credit--including ...

Page 83, Paragraph 2, line 9, read: At the very conservative yield targets set up, ...

Page 87, Paragraph 2, line 3, read: Tonosí represents in part a training ...

Page 87, Paragraph 5, line 3, read: These costs include the head-quarters staffs ...

- Page 89, Paragraph 4, line 9, read: constructed at different times  
in accordance with the phased  
...
- Page 90, Paragraph 3, line 5, read: roads, technical assistance,  
construction ...
- Page 90, Paragraph 3, line 8, read: to be the responsibility of the  
Municipio after ...
- Page 98, Paragraph 2, line 16, read: than 12% in 1974-1975. Like ...
- Page 104, Paragraph 2, line 2, read: the creation of organizational  
framework, limiting ...

APPENDIX

Annex I-E, Page 2

Page 6, No. 41-45, Action MOP, read: MOP/MIDA

Page 6, No. 41-52, read: 41-51

Page 6, No. 50-53, read: 50-51

Annex I-G, Page 4 of 4, Paragraph 1, line 7, read: criteria.

Annex II, Page 1, read: ANNEX II. ECONOMIC AND FINANCIAL DATA

Annex II, Page 2, line 3, read: source of income, total pre-project  
income would be about \$1,160 per ...

Page 2, Paragraph 1, line 7, read: income of farm B, are  
forgone) ...

Page 2, Paragraph 1, line 8, read: (excluding garden),  
cattle income and wages forgone, or  
...

Page 2, Paragraph 3, line 9, read: repayment schedules for  
for long term loans and for land  
payment will be ...

Page 3, Paragraph 2, line 4, read: milk reaches \$150 in  
in year three. ...

Annex II, Page 6, Paragraph 1, line 9, read: it is not yet known how many already have at least 50 ...

Annex II, Page 12, Paragraph 3, line 10, read: balance of \$120,000. ...

Annex II E, Table 13, Paragraph 1, line 10, read: Plowing and ...

Annex III, Page 5, lines 7 and 8, read: unemployed in the area.

Annex V, Page 15, Paragraph 3, line 5, read: show up, their ...

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others, and an infringement of these rights is cause for retribution. Even the minifundista respects the right of the latifundista to his extensive holdings, for in effect he conceives of himself as a potential latifundista. This characteristic is examined in greater depth in section 5 below.

In addition to the formalized labor relationships described above, there currently exist in Tonosí a multiplicity of organizations which may be deemed "cooperative" or "associative". This tradition is of significance to the project, for it indicates that there are indeed in Tonosí precedents for the type of organizational patterns that will be created under PRODIAR. Moreover, in the opinion of one of the organizational consultants, certain of these groups may play an active role in the project implementation process - that with preexisting grass-roots organizations it may not be necessary or advisable to reinvent the wheel by inaugurating an entirely new complex of grass-roots organizations.

A more detailed description of the function and role in the project of these organizations is contained in "Project Description" and "Institutional Analysis". A partial listing of these associative groups includes: agricultural cooperatives, savings and credit cooperatives, juntas comunales, juntas agrarias and asentamientos. A distinguishing feature of these organizations is the objective of the activities they undertake. Their activities may be "comunal", in that their objective is to improve the services or environment of the community as a whole, such as health, education, housing, environmental sanitation, potable water, etc., or their activities would be functional in character, involving some specific aspect of production such as irrigation, veterinary services, commercialization of production, etc. Recommendations for the inclusion of these groups in the rural development process are described in the "Communications and Local Participation" section below.

#### 5. Constraints and Issues for Project Feasibility and Implementation.

It is recognized that there are several potential social and political constraints on the feasibility and implementation of the Project. Preliminary analyses indicate that the major obstacles would be: the individualism of the Tonosí farmer; participants' and officials' resistance to active participation of campesinos in the development effort; and a series of existing social behavior patterns which might impede the attainment of the project objective. Each of these factors has been considered in the project design - and will be of overriding concern in implementation. A discussion of their possible role follows.

a. Individualism of the Traditional Farmer

The alleged individualism of the subsistence farmer and small rancher in Tonosí has been a subject of considerable discussion during project preparation. The issue of individualistic behavior in context of a joint production framework, an asentamiento, has been studied in Panama only superficially in a university paper.

The student asked each asentamiento member what would he do if another member decided to abandon the "asentamiento". Sixty-seven per cent of those interviewed answered that they would not try to prevent him from doing so. Furthermore, to the question of what to do about uncooperative members of the "asentamiento", 77% answered that they would not try to make them feel part of the group (in the sense of integrating them in group activities). It is evident from these results that there did not appear to exist any mechanisms which would insure group cohesiveness. Quite to the contrary, there appeared to exist norms about non-interference with individual decisions, even when they were detrimental to the functioning of the group. This lack of group cohesiveness is also apparent from answers to other questions in the survey. Sixty per cent of those interviewed stated that they were not willing to continue as active members of the asentamiento; 87% stated that they did not "feel as part of the group" in the asentamiento; 53% stated not liking to participate in the meetings of the asentamiento and 70% stated that they did not want to increase their level of participation in asentamiento activities.

It is not known whether this was a "typical" asentamiento, or a particularly unsuccessful one. However, the survey strongly suggests - inter alia - the need to work closely with production groups established in the project to foster mechanisms that will assure cooperation within the group - and hence their continuity. Indeed, the student was able to report, after working with the asentamiento farmers over a period of five months, that he had reduced their negative opinion of the asentamiento. Presumably the decrease in negative feelings was associated with an increase in participation in the asentamiento.

As indicated above, there is in Tonosí a historical tradition of cooperative labor patterns. Associative agricultural work groups and the exchange of labor for labor (trueque) are certainly not a new phenomenon in Tonosí, although these arrangements are gradually being replaced by salaried labor arrangements. There are two forms of exchange labor that require detailed study, for historically they have contributed a great deal to the configuration of local society: the "junta" and the "peonada".

The junta is perhaps the more widespread and better known of the two patterns. When a peasant has a particular task to accomplish within a very limited amount of time, usually one day, he invites kinsmen, friends, and "compadres" to help him. Assistance is strictly voluntary and no one is morally required to accept an invitation to a junta. Although one extends an invitation to a junta, this does not mean he is in turn obligated to attend a junta called at a subsequent date by one of his guests. The only social obligation incurred by someone who calls a junta is to provide food and drinks, usually fermented ones <sup>1/</sup> in sufficient quantity. In Tonosí, the number of volunteers who gather at a man's calling depends on his prestige or status within the community. It could be said that the junta is an excellent barometer of someone's standing in the social stratification system. The higher one's prestige, the more people will attend. A significant degree of his standing is determined by his largesse in providing food and drink.

Overall, the junta tends to be more a social than an economic institution. A strict economic analysis would probably reveal that the benefits a host obtains from a junta tend to be less than his contributions. All are invited to participate in a junta regardless of sex or age; and all who come have to be provided for regardless of the real amount of work they can actually do. Preparing a fare for 50 or 70 persons is quite an expensive undertaking, and can cost up to several hundred dollars. Nevertheless, peasants feel it is socially important to engage in a junta in spite of its costs. Although the host obtains a benefit, such as the building of a house or a fence in a day, the satisfaction of "la gracia" of gathering all of his neighbors is perhaps of paramount importance. During the last decade, however, particularly after the building of the road linking Tonosí to the rest of Los Santos province, the "junta" is beginning to disappear. Nowadays, peasants with medium-sized farms engage in it very seldom. It is rather among the minifundistas and the landless peasants that this institution is still to be found. Wealthy cattlemen with large ranches simply do not participate in juntas; it is becoming an activity of agriculturalists and not of cattle breeders.

The "peonada" is the second labor sharing institution observed in Tonosí which despite present social changes is still

<sup>1/</sup> This fact is in itself an indication of the progressive deterioration of this social custom. Originally only food and refreshments were served. The increased use of alcoholic beverages indicates a need to entice participants which was not evident before. (Chang-Marín).

widespread among the peasantry. Unlike the "junta", where everybody is invited to come and help a neighbor, the "peonada" is a more selective affair, for only skilled men are asked to participate. The host has to provide food and drink, but he acquires a stronger contractual obligation to return, within the same agricultural year, the amount of labor he has received from his friends. A "peonada" might also involve several days work; usually heavy agricultural activities like jungle clearing with axes ("tumba de monte").

Because it is selective and involves men of productive age, this institution is widely used in Tonosí today by peasants belonging to different social strata with the exception of the very large cattle breeders. Besides clearing jungle, it is widely used for critical agricultural jobs like planting, weeding and harvesting. However, in ranching activities, it is only employed for clearing weeds from pastures with machetes. The "peonada" like the "junta" is disintegrating as a social custom mainly because of the influx of new forms of labor exchange as the need for cash increases among the lower classes. For example, wealthier farmers are increasingly repaying whatever labor they owe by hiring men to do the job for them. Since the hired men had not participated in the original agreement, the quality of their work tends to be low. They feel no reciprocal obligation, but are only interested in the commercial aspect of the arrangement.

In short, patterns of associative labor do currently exist in Tonosí, and can be observed among the social target groups of the project. Though they are on the decline, it may be possible to build on these traditional patterns.

In addition to inferences drawn from apparent attitudes and experiences in other rural areas of Panama, two empirical observations tend to caution against excessive emphasis on collective farming at the outset in Tonosí: the failure of recent attempts to establish asentamientos in the area, and the Bayano basin relocation experience.

Of three asentamientos created in 1972, only one remains whose 15 families comprise a few survivors of the other two. Campesino attitudes may not have been the sole - or even the most important - reason for failure: one asentamiento was established on a previously uninhabited island accessible only by boat or - during low tide - by wading across the tidal flats and mangrove swamps. But the experience merits thorough study to identify the basic problem. (Another experience that will be studied with a view to certain operational conclusions is the asentamiento "Nuevo Tonosí" in Colón province on the Atlantic side, composed of migrants from Tonosí district.)

The experience in the population relocation program in the Bayano basin hydroelectric reservoir may also be illustrative. Several hundred peasant and indigenous families had to be relocated and compensated for their previous landholdings. All peasants - about 700 families - had originally migrated from Los Santos province to the Bayano jungles, where they had cut and burned the forest and replaced it with pasture. But only 40, mostly the landless and a few minifundistas, accepted the government relocation scheme, which involved receiving land to be worked communally in the form of asentamientos. Most resisted such a proposal, preferring instead to obtain a cash compensation which would allow them to move on to another frontier zone.

Pending investigations in greater depth which are already under way, operational conclusions are at best premature. However, it does seem clear that the creation of all forms of association for economic ends - from marketing cooperatives to joint production arrangements - must be approached with caution. Objective and systematic studies of the most common existing forms of economic association in rural Panama - asentamientos, juntas agrarias and cooperatives - are lacking. But isolated observations indicate that in Panama, as elsewhere, organizability of campesinos depends very largely on conditioned attitudes. Thus, for example, all forms of economic association seem to thrive much better among former banana company workers, accustomed to organized action and work, than among former semi-nomadic subsistence farmers. It is the latter - in addition to small cattle raisers - who constitute the bulk of the target population in Tonosí. It clearly continues to be the Government's goal to promote forms of rural association designed to overcome the social, economic and political disadvantages of an atomistic peasantry which, moreover, has few roots in traditional, stable peasant farming. The Tonosí project will attempt to introduce novel forms of association, based on voluntary participation in small, socially compatible groups of families (preferably with some kinship bond) supported by suitable incentives that will not degenerate into threats. Such groups may be later expanded into larger units, at the same time as they, as well as individual participants, are drawn into single or multi-purpose cooperatives, through an educational process designed to enhance the awareness of participants that common action offers opportunities, and of the officials that precipitate social change has its pitfalls.

b. Active Participation of Campesinos and Cattle Ranchers in the Project

There are three key aspects to the participation of the population of Tonosí in the development of the district: (1) the

participation of the target population in the decision-making process; (2) the transfer of administrative, organizational and technical ability from the administrative staff to the target groups; and (3) the attitude of the official staff towards their own phase-out.

1. Participation of target population in the decision-making process: The initial participation of peasants in the administrative, technical and financial decisions of the sub-projects will be low. There is ample evidence to support this belief. A survey of a representative sample of campesinos in asentamientos in the province of Veraguas found a paradoxical relationship between the "asentados" and government personnel with regard to the participation of the former. (Aguirre and Hidalgo). In answer to the question "In meetings with other asentados do you almost always express your opinion?", fully 94% of the asentados stated that they did. However, government field personnel estimated that only 25% would state that they expressed their opinion. Field observation revealed that in fact very few asentados expressed their opinion at meetings. There are several possible explanations for the apparent discrepancy between the perception of asentados and government personnel. The first and most obvious is that the asentados were giving what they regarded as the most socially desirable answer. Second, it is possible that they truly felt they were participating in the discussion. Finally, it is possible that the asentados considered that their mere physical presence at the meetings was adequate participation.

The low expectations of government employees with regard to peasant participation are of some concern. This case may be a good example of a self-fulfilling prophecy at work. Government employees expect asentados to participate very little at meetings. That low expectation makes them behave in ways which prevent or hinder participation by the latter; a result which reinforces the low expectation. In this way a vicious cycle of "low expectations - poor performance - stronger low expectations" repeats itself. This cycle could be broken by training field personnel, particularly at the local level, in group dynamics and reinforcement techniques so that they could structure their own behavior and create group climates in order to facilitate increased participation by the asentados. Local level project personnel must therefore have a thorough knowledge of cultural patterns within the region. Heckadon (1973, p. 67) mentions a case in which the unwillingness of the asentados to participate in the asentamiento led to the eventual take-over of the project by the government employees in charge. The campesinos' unwillingness was due to their reluctance to work at what they considered to be traditionally feminine chores. The take-over of the program by government employees could have been avoided if the initial decision to develop a chicken farm had been evaluated in light of the cultural norm which assigned that activity to women.

Although the initial balance of participation in the decision-making process will be tilted in favor of government employees, there should be a gradual withdrawal of their presence and an equally gradual emergence of local leaders. This process leads to the next aspect.

2. Transfer of administrative and technical know-how: Two prerequisites for full participation of local farmers in the decision-making process are: a) that they have the knowledge that will permit participation and b) that they feel capable of using that knowledge. Aguirre and Hidalgo (1976) speculate that the reluctance of some asentados to participate may be based on an awareness of their own ignorance. If that is so, one should expect an increased participation as they become more knowledgeable.

The transfer of administrative and technical know-how can be accomplished by setting up a chronology of objectives to be achieved as assistance is withdrawn. The sub-projects gradually should address themselves to this process. At the very least, project personnel should be made aware of the fact that there is a definite goal which calls for the transfer of technical know-how. This could be facilitated by training personnel in interpersonal communication skills. The training should not only teach project personnel to transmit information in an understandable manner, but also increase their ability to be receptive to the feedback provided by the peasants.

3. Attitude of Project personnel towards their own phase-out: Since intensive public intervention in the district of Tonosí is a temporary project, the governmental involvement in the area should gradually diminish as attention is shifted to other impact areas. Although this is a minor issue, there exists the possibility that government personnel may be reluctant to abandon an area, especially if the sub-projects are experiencing any degree of success. It is a very natural human tendency to be eager to enjoy some of the credit for a project's success. This tendency, which may foster some sort of reverse dependency, could contribute to maintain obsolete governmental structures. In other words, Project personnel may come to see themselves as essential to the continued success of the sub-projects and behave in ways that would promote a mutual dependency.

c. Relocation of Farmers and Cattlemen

One of the major assumptions underlying the project's implementation is the desirability, from the point of view of a great many subsistence campesinos and small cattlemen (or at least their acceptance) of relocation from lower capability hillside plots to land suitable for their planned activities. In principle, this plan

should not run into any tangible opposition from participants. The bulk of the farming and ranching population are first generation occupants of the land which they currently occupy. They are not likely to have developed deep, ancestral ties to such land, and there will be few if any cases where investments have been made of such magnitude as would lead the occupant to resist abandoning the parcel, especially if he were to receive some compensation for the investment.

This supposition is reinforced by the fact that the vast majority of the participants do not have title to the land they are presently occupying. Thus, the incentives being provided by the project in terms of quantitatively and qualitatively adequate land as well as priority access to all basic public services, are assumed to be more than sufficient to effect the planned relocation without substantial friction, particularly since spatial analysis indicates that most project participants will be able to remain in their corregimientos of present residence. The assumption is further reinforced by the strong migratory tradition of the peasantry of Las Tablas province, i.e., relocation within one and the same corregimiento would hardly compare in their minds to their customary move halfway across the country to the jungles of the Bayano. Moreover, experience has shown little if any difficulty in the resettlement of the approximately 5,000 families currently living on land reform asentamientos, most of whom had been subsistence squatters on other lands.

d. Social Attitudes

i. Alcoholism: The 1976 study of asentamientos in the province of Veraguas (Aguirre and Hidalgo) states, based on simple observation, that the level of drinking is high and widespread among male peasants. Although they fail to support this impression with a quantitative assessment of the prevalence of the problem, they observed that male peasants drink up to three times per week with the drinking being done during work days. On several occasions asentados attended regular meetings of the asentamiento intoxicated, and exhibited aggressive behavior which interfered with the proceedings. Many asentados began drinking early during the work day claiming that drinking made them feel strong enough ("que se sentía fuerte") to work all day long. Obviously, this behavioral pattern cannot be very conducive to a high level of productivity.

The results of the study also show that the asentados themselves are aware of the detrimental effects of drinking on their performance. Eighty-five per cent (85%) answered negatively the question "When you drink do you work the same as when you don't?"; and 86% answered positively the related question "When you

do not drink do you work more than when you do?" Clearly then, there is an inconsistency between their belief that drinking makes them "strong" enough to work all day and their recognition of its detrimental effects on their performance. The researchers did not probe further into the apparent causes of this inconsistency nor into the social or psychological factors which encourage a high rate of drinking.

There is some evidence, however, which indicates that drinking is definitely a normative behavior in the culture which allows males to prove their masculinity. The 1976 study observed strong social pressures aimed at inducing non-drinkers to join a drinking session. For example, non-drinkers were rejected or treated coldly. In spite of this observation, when questioned directly about that social norm, 70% of the *asentados* denied it existed. There is other evidence which points to the prominence of drinking as a culturally sanctioned and even required behavior.

Informal field investigation in Tonosí indicates that the district is no exception to the widespread rural alcoholism in certain rural areas of Panama. In-depth studies, already initiated, will indicate to what extent it is a social, as distinct from a psychological, phenomenon, i.e., whether creation of a different social awareness and of alternative opportunities for employment of participants' time will tend to change the pattern, or whether longer-run experiments in group therapy are required.

ii. Absenteeism: Work absenteeism, as a problem in joint production groups, is closely related to alcoholism, on the one hand, and to a low level of social awareness, on the other. The day after a binge, many *asentados* fail to report for work, and if they do show up, their day-long concern is not the particular task at hand, but how to handle the effects of the hangover ("cómo manejar la gema"). Also, because of the relatively low labor requirements for mechanized rice farming and because of the generally seasonal nature of both agricultural work and income, many members of group farming schemes seek supplementary sources of employment and income. Owing to the high seasonality, these sources, especially construction and farm labor, tend to become competing alternatives to asentamiento activities. So do family parcels when they are large and need to be worked during the same time of year as the collective land.

This is precisely the kind of phenomenon that is symptomatic of low levels of success or failures in many land reform programs where collectivization was imposed from above and insufficient attention was devoted to help the settlers develop a new self-awareness. Dependency breeds or reinforces mistrust in one's ability

to influence the course of events and thus leads to disinterest in the common welfare as envisioned by the social planners. By not imposing preconceived schemes, promoting real participation in decision making, and encouraging the creation of joint enterprises only where participant attitudes expressly favor them, the project intends to avoid these pitfalls and help create a sound basis for an interdependent society.

iii. The Traditional View of Women: There is ample evidence of the existence in rural Panama of what appear to be negative attitudes on the part of males towards having women participate in - or to share with them - activities that are perceived by men to be traditionally male tasks. On the other hand, women participate freely in decision making and implementation of community welfare activities and certain agricultural tasks are perceived to be typically feminine, such as rabbit and chicken raising and family gardening. More active participation by women could probably be accomplished by identifying relevant labor areas through which to promote their role in development. A long range goal of any program regarding the social status of women in Tonosí could be the creation of a greater and more diversified employment opportunities for women. Presently, job opportunities for women are very limited in Tonosí, since the major economic activities are agriculture and cattlebreeding. Traditionally, women have emigrated to Las Tablas or Panama City seeking better job opportunities, usually as domestics in the homes of the more affluent classes.

Another mechanism which has contributed to the migration of women to urban areas is the social norm of education as a feminine activity. This norm in effect reflects economic needs of the region. While young boys are usually plucked from school to help with agricultural and ranching activities at home, girls are permitted to continue attending school. Thus, a larger percentage of females attain more advanced standing in education. Their higher academic achievement causes them to migrate more intensely than their male counterparts.

Common law marriages are quite prevalent in the areas as in other rural districts and desertions are common. A substantial number of widowed or deserted women exist who are heads of families; special programs and measures will be designed for them. It appears that the priority for women in this area is to sanction and protect their traditional roles while gradually giving them a greater voice in decision-making, at both the family and community levels.

iv. Other Attitudes:

Work and Leisure: A marked leisure preference,

closely associated with the deep-rooted, traditional, local fiesta patterns, is evident among all social strata of Tonosí. The traditional fiesta pattern is linked with the traditional cooperative labor forms, and the fiesta structure is frequently used by cattlemen and farmers alike to accomplish specific work tasks as described earlier. Further investigations planned during the next few months are expected to lead to conclusions on how the fiesta patterns might be channelled into more constructive social and economic activities.

Technical Innovation: Attitudes towards technical innovation and acceptance of, or resistance to, innovations are significant factors in the implementation and success of the activities planned under the project. As mentioned above, presently available information indicates that the professional and commercial class that also engages in cattle breeding and farming are the most innovative group. However, certain innovations have been adopted even by the more traditional members of the Tonosí population, as demonstrated by the introduction of purebred dairy bulls and of irrigated tomato growing. The provision of credit will of course be a typical incentive for the adoption of certain innovations as part of a package of services delivered in an integrated fashion. Attempts will be made to identify actual or potential innovators through whom gradual technological improvement can be introduced.

The Environment: The destructive attitude of the typical Azuero and Tonosí campesino and rancher towards the natural environment is a serious constraint for resource protection and rehabilitation. Preliminary investigation confirms that the typical campesino and rancher of Tonosí and the rest of Azuero has a flagrant disregard for the need to conserve forest resources and ignores the potential for rational forest utilization. Overcoming this constraint will require a vigorous, intelligently conceived educational campaign (along with measures that insure rational use of land, according to its capability), to motivate people to co-exist peacefully with the remaining forests and with the commercial and protective tree plantations that will be established.

Public Officials: Historical developments in the Tonosí area have left the populace with a negative attitude towards public officials. But with the introduction of important new public services during the last 10 years, such as an agricultural extension service, a branch office of the Agricultural Development Bank, a health center, rural water supplies and a basic cycle production school, it must be assumed that this attitude is shifting. It is believed that the brokerage function exercised by the elected corregimiento representatives has been significant in catalyzing this transition. As indicated in the Project Description and the

Institutional Analysis, these representatives, along with the Juntas Comunales (see below) will be important in building public trust in government officials and in stimulating greater grass-roots participation in development.

6. Communications Strategies and Local Participation

The role of the campesinos and cattlemen of Tonosí as participants in a project designed to improve the levels of living of the poorest residents of the region, has been a focus of concern during the early planning phases of the project. The assumption that the population of Tonosí must be active participants in the project - not passive "beneficiaries" - is unquestioned, and several social scientists have analyzed the current climate for local participation, and given suggestions for "client participation". (Miller, I and II; Demeure).

As noted above, currently existing organizations include agricultural, savings, and credit cooperatives, juntas comunales, juntas agrarias, and asentamientos, in addition to the padres and madres de familia and community health committees which are usually concerned with improvements in community health and welfare. These groups fit Demeure's definition of a rural development organization: "a free association of farmers or cattlebreeders who live in the same area, or who carry out similar functions, and decide to organize themselves to resolve their problems in a unified fashion, and undertake a process of change development".

Given the fact that these grass-roots organizations already exist, and serve the interests of their members, and/or the population they represent, their legitimacy must be recognized. The inclusion of grass-roots organizations in the refinement and implementation process is probably the strongest guarantee of the project's success.

Clearly, certain organizations will be weaker than others; what is important, especially in view of the fact that still more new grass-roots organizations will be established as the sub-projects get under way, is that the multiplicity of groups be coordinated at the local level, so that they do not work in an isolated fashion. They should remain autonomous, maintaining the freedom to act in their members' interests, yet they should be able to delegate representatives to the local project area team. One of the consulting social scientists suggested numerous functions local organizations could perform under the project: participation in the construction and maintenance of community services provided under the loan; distribution of materials such as seeds and fertilizers; participation in the administration of various sub-projects, and participation in credit management. These are merely

possible avenues for local participation which, in addition to giving the target population a decision-making voice in the sub-project, will prepare them to carry on the project as government gradually withdraws its personnel to concentrate its development efforts in other regions.

The gradual withdrawal of the GOP management personnel and take-over of their functions by representatives of the target population leads to the issue of "communication strategies". It would be naive to assume that 100% of the people and grass-roots organizations would immediately want to participate in the sub-projects. It has been suggested that such ostensible enthusiasm would not reflect a true commitment such as is needed for the success of the project. Moreover, it is expected that some members of the target group will never become involved in any associative or cooperative group or organization.

It is recognized that recruitment of participants will occur gradually. Grass-roots organizations should not be forced to assume responsibilities for which they are not ready. Rather, the project, its purposes, and resources should be publicized as widely as possible throughout Tonosí, using open meetings, discussions and forums with consejos municipales, juntas comunales and other local groups and perhaps radio stations. The Area Team should begin then to discuss some specific sub-projects with these representative organizations. Only gradually, and with ample and appropriate encouragement, will new client groups organize themselves and approach the area project team with specific proposals.

#### 7. Social Consequences and Benefit Incidence

If carried out in accordance with its design, the project is expected to rank very high in terms of positive social consequences and of the incidence of its benefits among the poor majority of the project area. Indeed, as indicated in Section II B, project participants will be recruited strictly from the more than 50% of the population estimated to fall below the Panamanian poverty level of annual incomes of \$200 per capita or about \$1,000 per family. They will be provided above all with quantitatively and qualitatively adequate land resources and they will have priority access to all public investments and services to be provided by the project. Thus, while the longer term planning for the district will eventually involve all of the population, the five years of the present project are designed to give the rural poor a head start rather than putting them at the end of the line as so often happens in agricultural development.

a. Priority access to resources and opportunities is thus specifically built into the project. Indeed, such access could well be termed exclusive for the rural poor target group. The only major investment of the project the benefits of which are not divisible between project participants and others is the road improvement program, but even here the network has been designed to coincide as much as possible with the probable areas of settlement of the target population. Credit will be channelled exclusively to the target group and they will have first call on technical assistance services and on such marketing facilities and services as will be provided under the project. Farm machinery procured under the project will be utilized for contracting by project participants or their groups on an absolute priority basis, and will be available to other farmers in the area only after the formers' requirements are completely satisfied.

Redistribution of wealth will be tangible inasmuch as approximately one-fourth of the land occupied in 1970 by farms with 50 hectares or more will be allocated to the target group, who occupied only about four percent of the total land in farms in 1970. Income redistribution, based of course on a sharp increase in total agricultural income, will also be substantial. It is estimated that per capita income of the target group at constant prices will increase at a cumulative rate of approximately 20% per year of actual project participation (before long term debt amortization), although this increase is likely to be somewhat slower for cattlemen than for crop farmers; for the latter, the impact is likely to be felt already during the first year of participation.

b. Despite the theoretically relatively full employment that appears to prevail in Tonosí without the project and despite the substantial mechanization of certain cropping operations explained and justified elsewhere in the Project Paper, the project's impact on employment is expected to be considerable in three respects: 1) The agricultural production and forestry plans have been designed in such a way as to maximize employment of the target group on a month-to-month basis insofar as compatible with maximization of family income from the points of view of a) choice of lines of production and b) technological requirements of certain crops as explained in Part III. 2) The spread effect of the relatively massive public investments and increase in public services, especially technical personnel, are expected to lead to substantial growth in demand for labor among the larger farms and ranches in the area. Indeed, a local labor shortage might result in view of the great seasonality of certain operations. With the project participants fully occupied on their own farms, a side effect of the project may well be the attraction of landless or underemployed campesinos from neighboring districts in the province. This leads to the next point.

c. Attraction of "surplus" rural labor force from neighboring districts of Las Tablas province would be a highly desirable side effect of the project inasmuch as the province has traditionally been the principal source of rural migrants in search of better opportunities in frontier and urban areas. The land/man ratio in Tonosí is still tangibly greater than in neighboring districts and there is in principle room for settling a substantial number of poor rural migrants from other districts during the second phase of the Tonosí development program under criteria and methods similar to those proposed for the project. On the other hand, displacement within the project area is not expected to constitute a social problem, as explained earlier.

d. As in all agrarian reform programs or projects, such a substantial redistribution of rights in land as is proposed under the project will almost automatically lead to a tangible shift in local power relationships, provided this redistribution of wealth is translated into the kind of participatory development envisioned by the project, as explained earlier and in Section II B and under Institutional Analysis. Moreover, successful implementation of the project is expected to have a regional and national spread effect through grass-roots pressure for the Government to undertake similar regionally conceived and implemented, agrarian reform-based development efforts.

#### 8. Conclusion

The unique history of the Tonosí district has been largely responsible for the special configuration of social patterns and attitudes observable today. Despite the lack of systematic research on the Tonosí region, enough is known about the social characteristics of the area, and in particular of the target population, for the project design to have taken them into account.

The Mission recognizes the need for additional sociological and psychological data about the target population as implementation gets under way, in order to best guarantee the success of the project. These have already been initiated and the information will be incorporated into the more detailed planning and implementation of the project.

REFERENCES

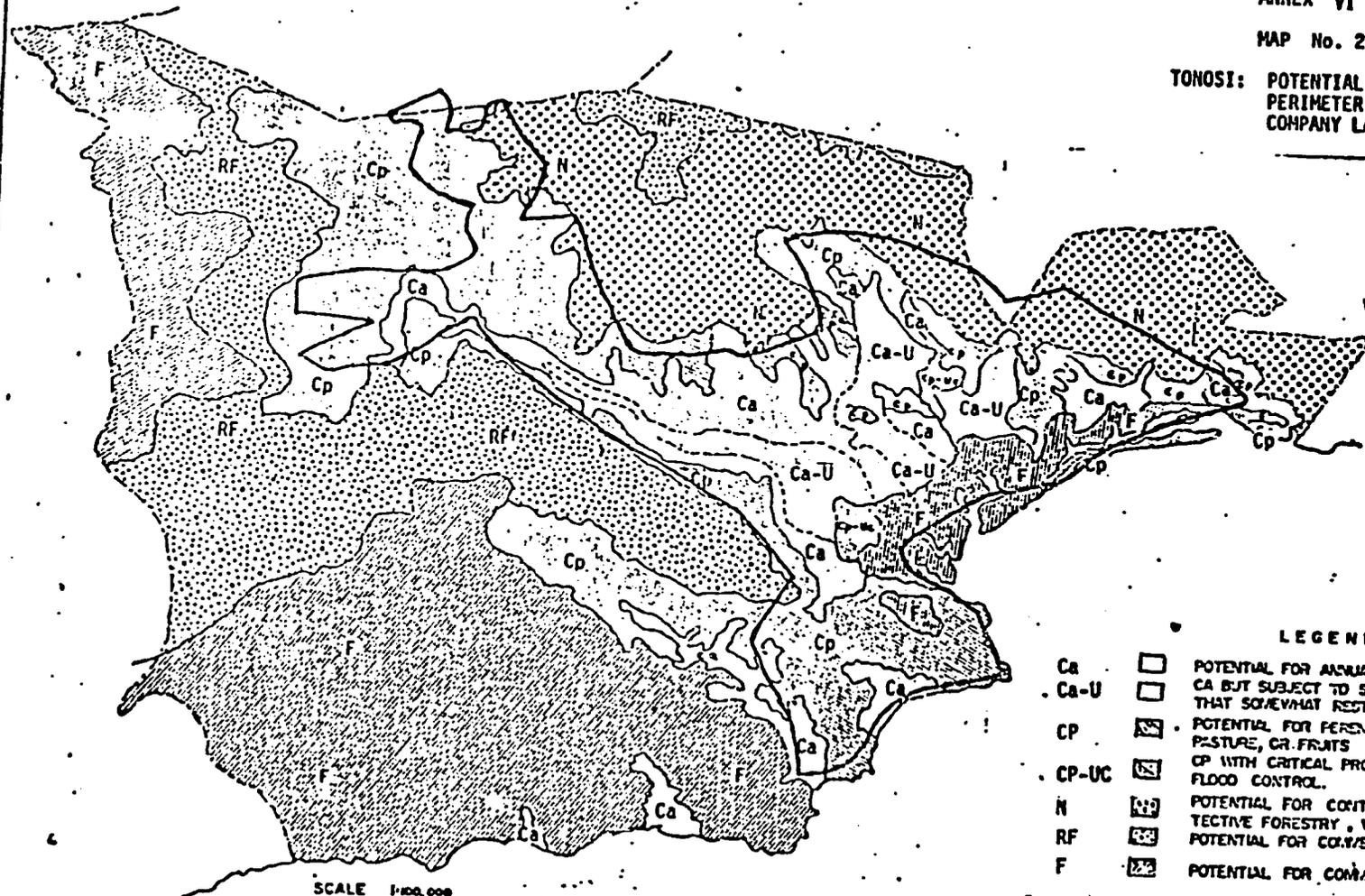
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ANNEX VI

MAP No. 2-A

TONOSI: POTENTIAL LAND USE AND  
PERIMETER OF FORMER UNITED FRUIT  
COMPANY LAND



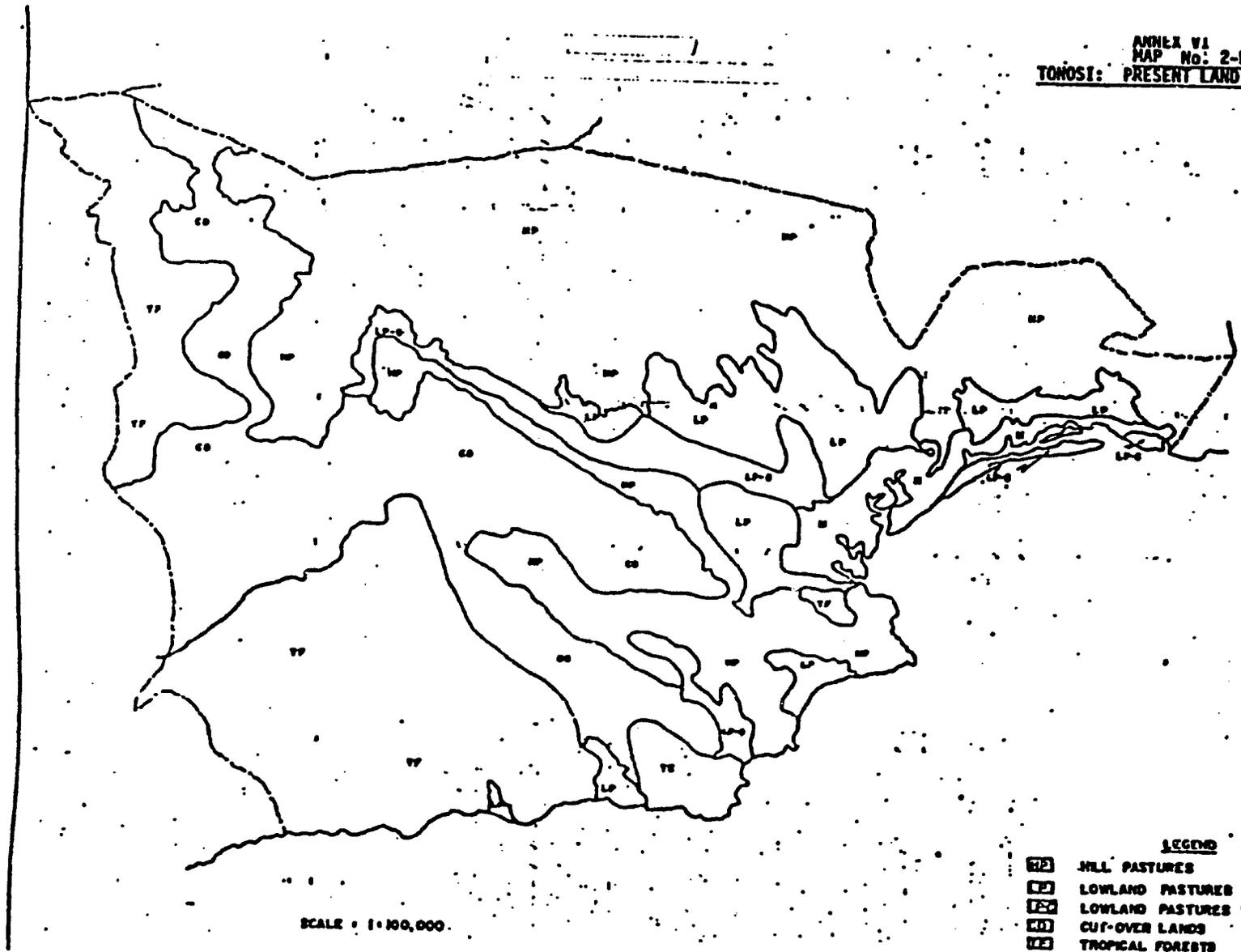
LEGEND

- |       |  |   |
|-------|--|---|
| Ca    |  | POTENTIAL FOR ANNUAL CROPS.   |
| Ca-U  |  | CA BUT SUBJECT TO SEASONAL FLOODING<br>THAT SOMEWHAT RESTRICTS AGRICULTURAL USES.       |
| Cp    |  | POTENTIAL FOR PERENNIAL CROPS, GENERALLY<br>PASTURE, OR FRUITS                          |
| Cp-UC |  | CP WITH CRITICAL PROBLEMS OF DRAINAGE AND/OR<br>FLOOD CONTROL.                          |
| N     |  | POTENTIAL FOR CONTROLLED GRAZING OR PRO-<br>TECTIVE FORESTRY, WITH STRICT CONSERVATION. |
| RF    |  | POTENTIAL FOR COMMERCIAL REFORESTATION.   |
| F     |  | POTENTIAL FOR COMMERCIAL FOREST UTILIZATION.  |

SCALE 1:100,000

BASED ON FIELD INTERPRETATION OF 1967  
CADASTRAL MAPPING

ANNEX VI  
MAP No: 2-B  
**TONOSI: PRESENT LAND USE (1976)**



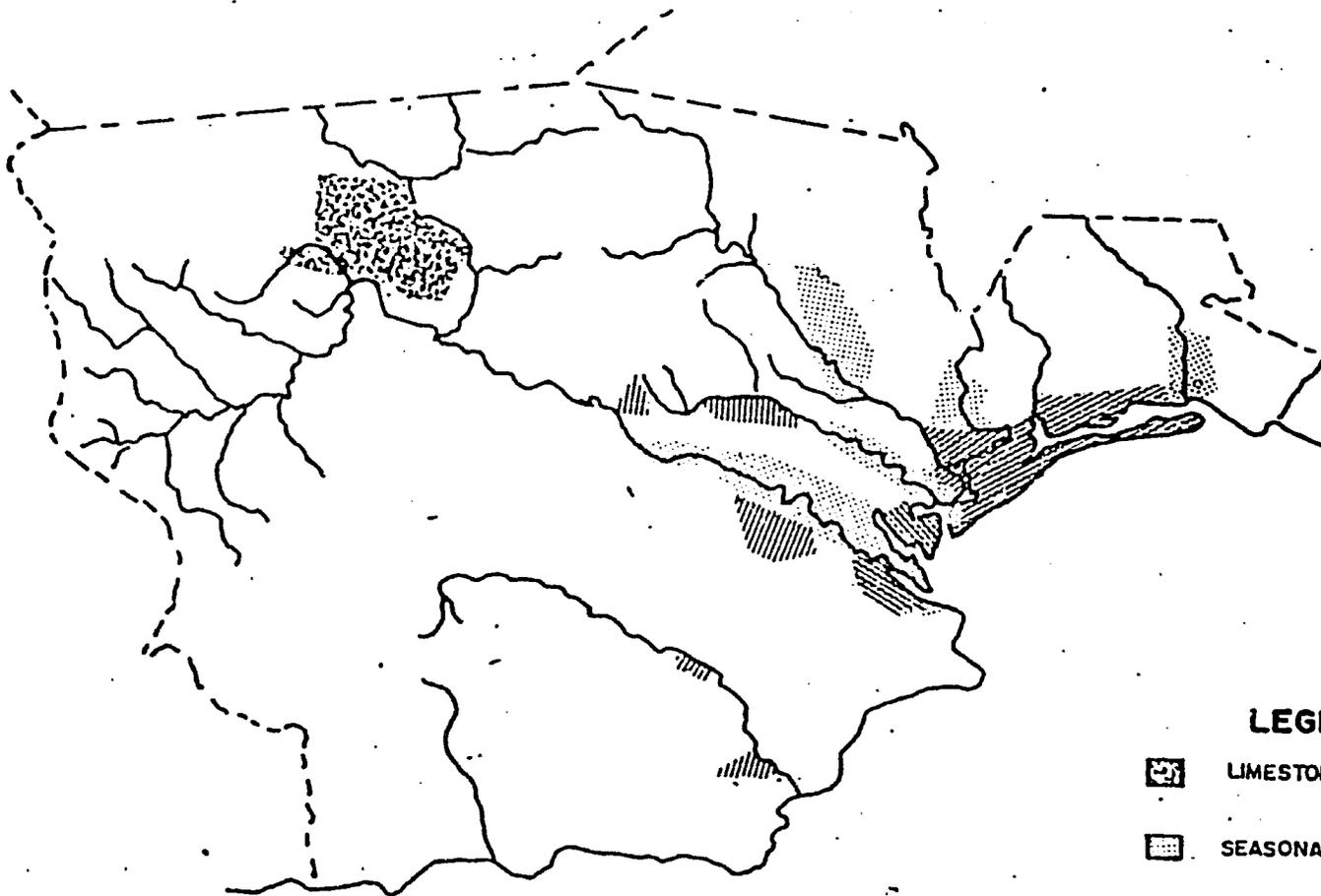
SCALE : 1:100,000.

- LEGEND**
-  HILL PASTURES
  -  LOWLAND PASTURES
  -  LOWLAND PASTURES WITH CROPS
  -  CUT-OVER LANDS
  -  TROPICAL FORESTS
  -  MANGROVES

**TONOSI: RIVERS, SWAMPS, AREAS SUBJECT TO SEASONAL  
FLOODING AND LOCATION OF LIMESTONE DEPOSITS.**

**MAP No. 3**

N

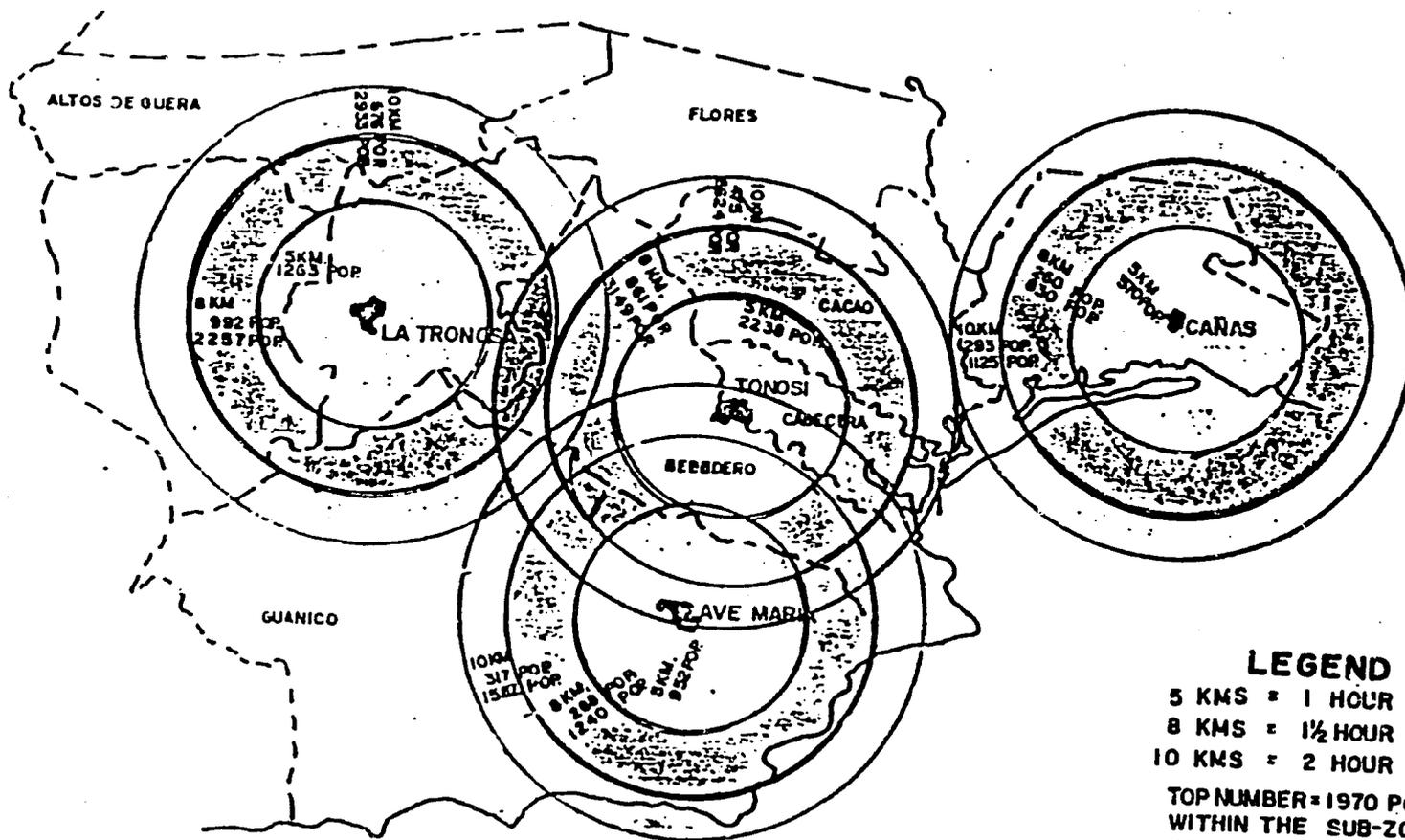


**LEGEND**

-  LIMESTONE DEPOSITS
-  SEASONAL FLOODING.
-  SECONDARY FLOODING.
-  MANGROVE SWAMPS

TONOSI: SERVICE CENTERS WITH THE RADIUS OF ACTIVITY AND 1970 POPULATION.

MAP No. 4



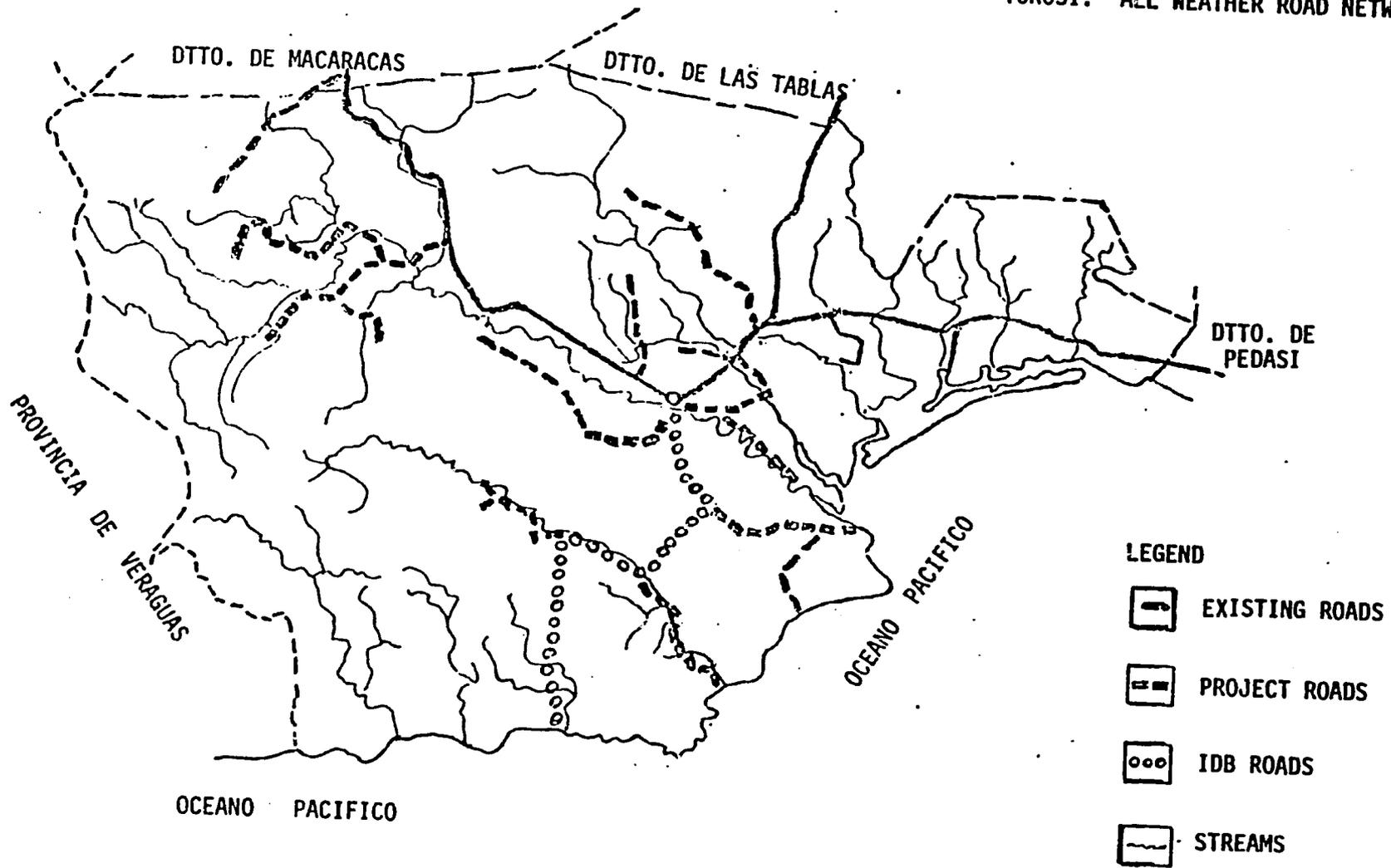
**LEGEND**

- 5 KMS = 1 HOUR WALKING
- 8 KMS = 1½ HOUR WALKING
- 10 KMS = 2 HOUR WALKING
- TOP NUMBER = 1970 POPULATION WITHIN THE SUB-ZONE.
- BOTTON NUMBER = ACCUMULATED POP. FOR THE RADIUS.

ANNEX VI

MAP No. 5

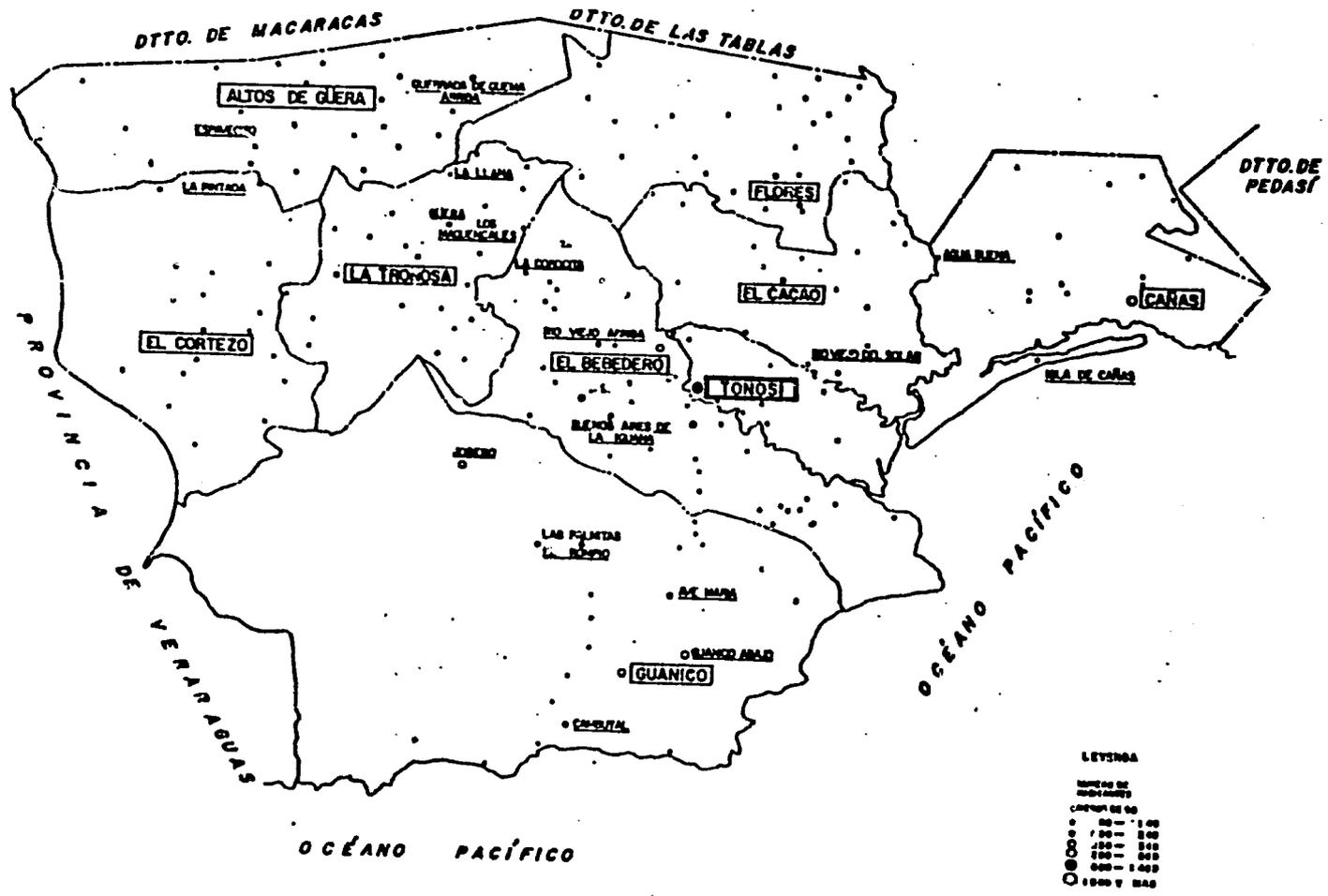
TONOSI: ALL WEATHER ROAD NETWORK



SCALE 1:200,000

ANNEX VI  
MAP No. 6

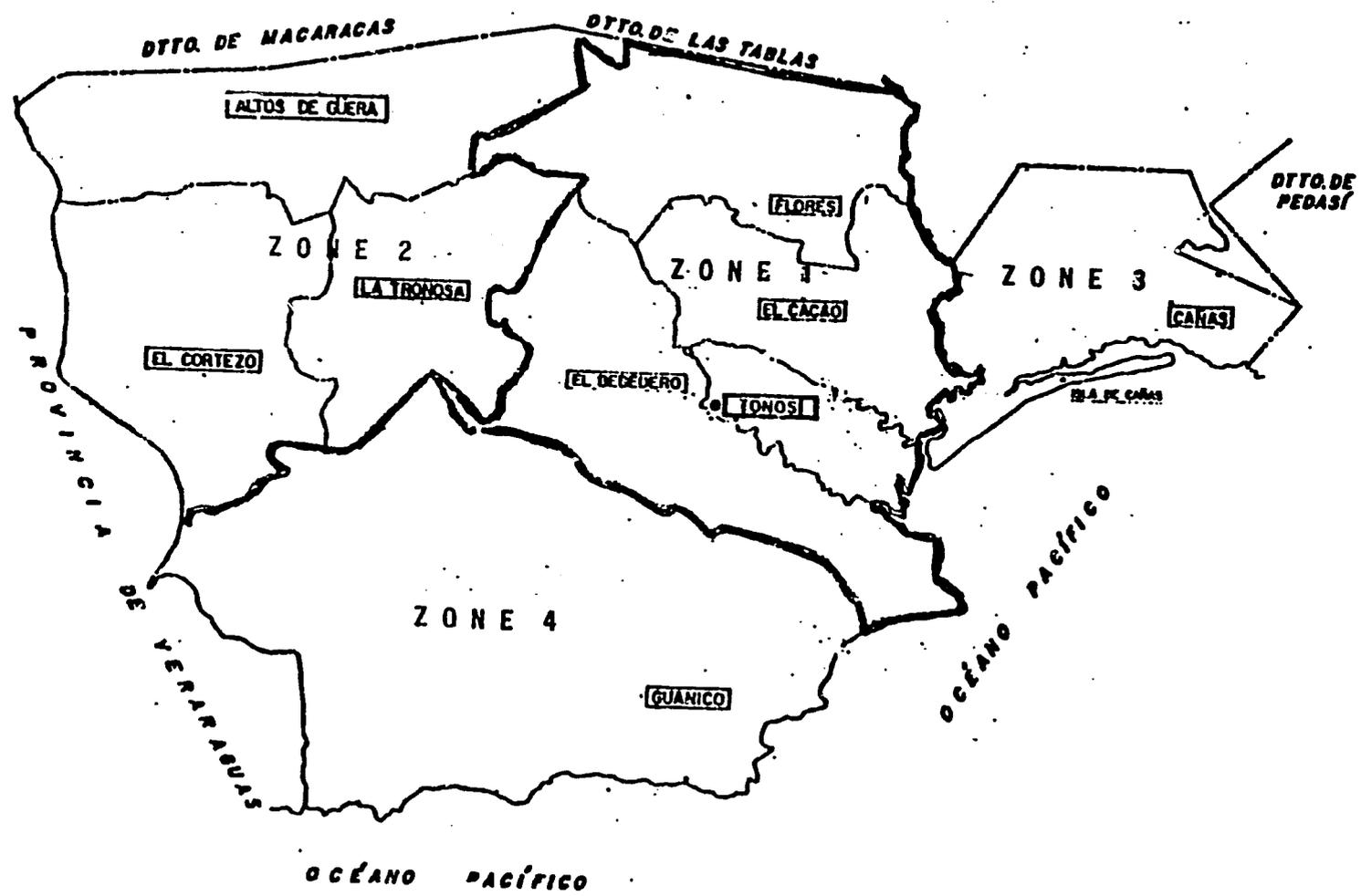
TONOSI: DISTRIBUTION OF HUMAN SETTLEMENTS





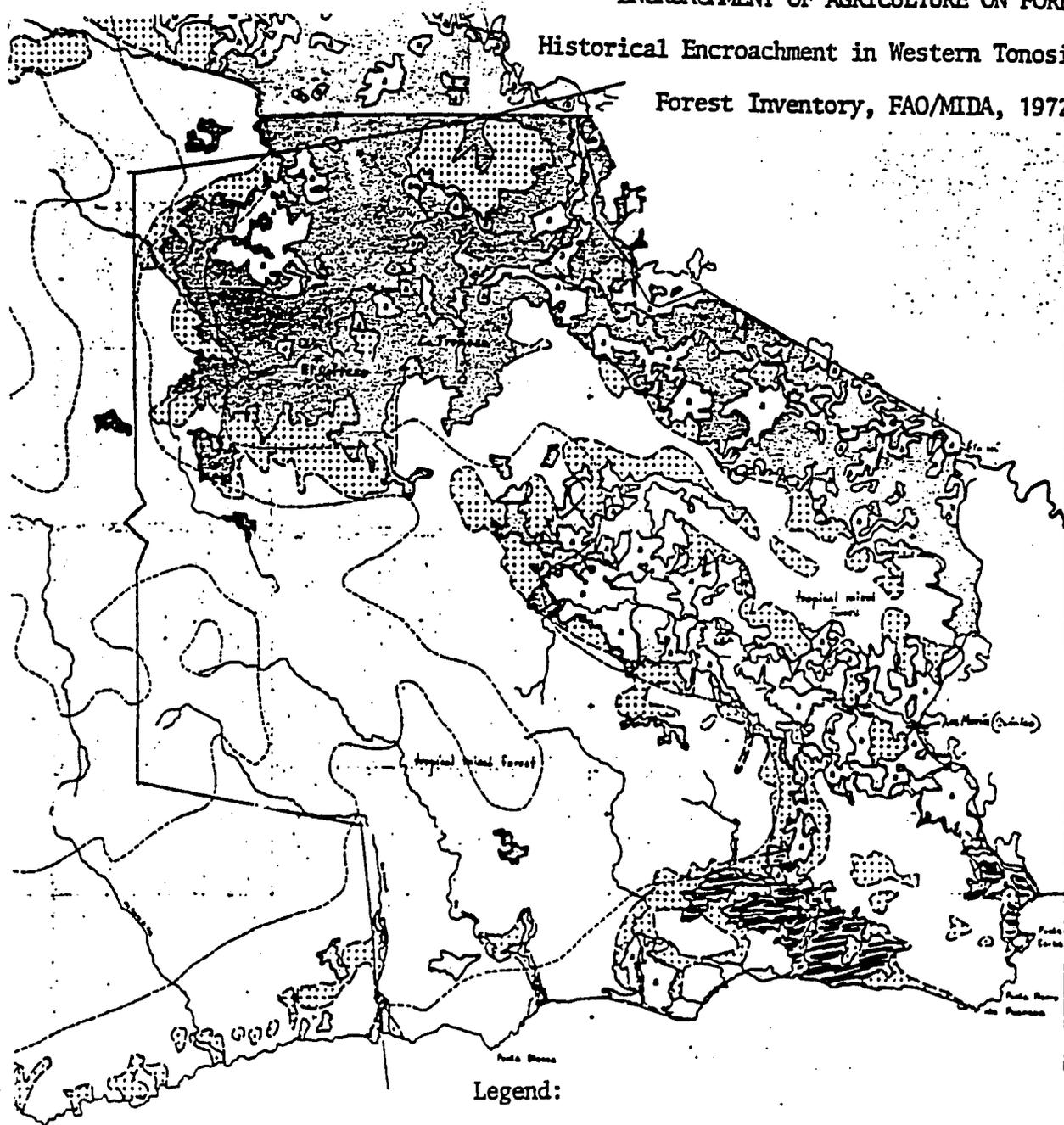
ANNEX VI  
MAP No. 8

TONOSI: CORREGIMIENTOS AND SERVICE ZONES



ENCROACHMENT OF AGRICULTURE ON FORESTS

Historical Encroachment in Western Tonosi District  
Forest Inventory, FAO/MIDA, 1972



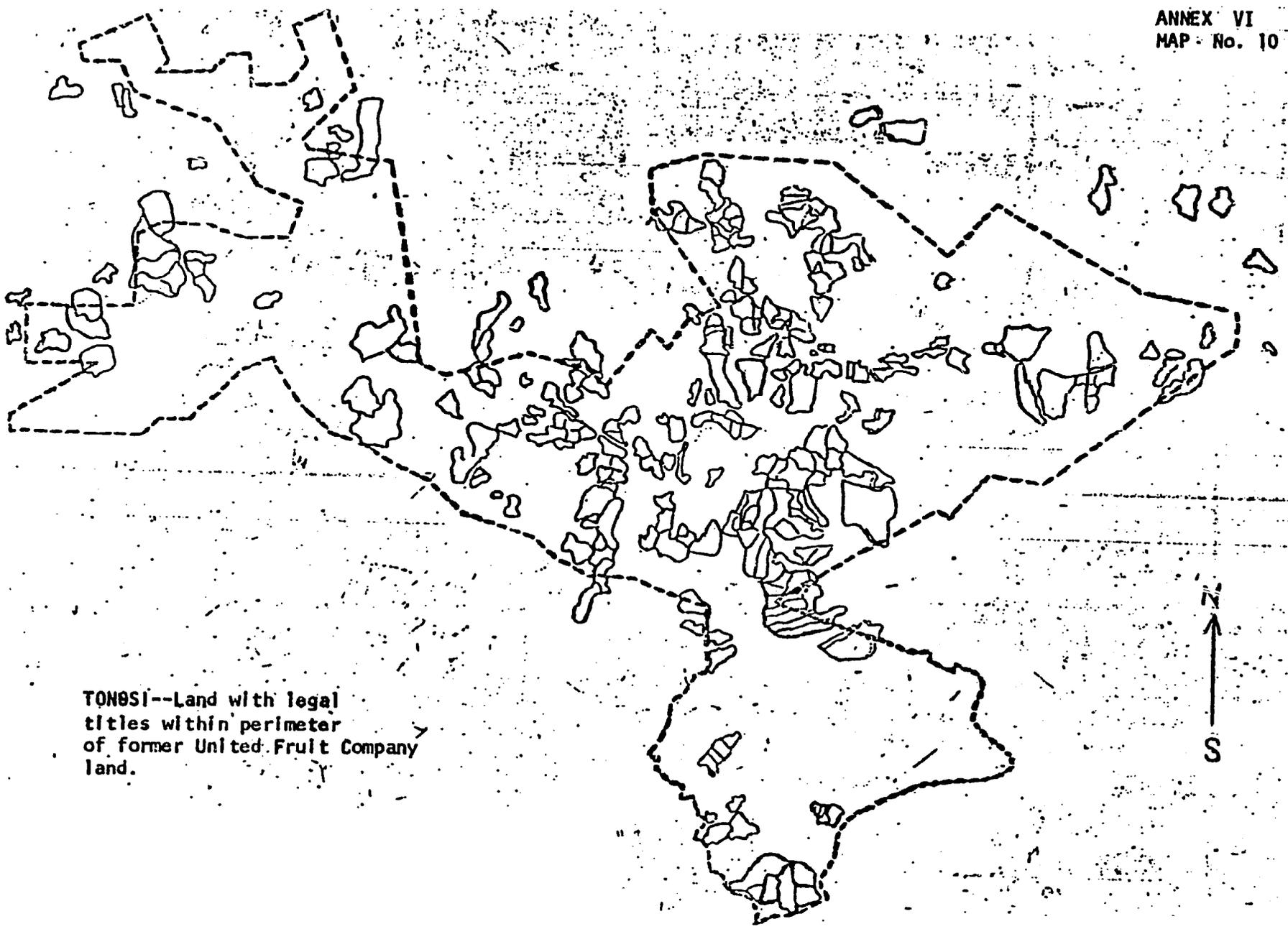
Legend:

- Boundaries of Ecol. Life Zones -----
- Agricultural areas, existing in 1954 [light stippled pattern]
- Agricultural areas, cleared 1954-1964 [medium stippled pattern]
- Agricultural areas, cleared 1964-1972 [dense stippled pattern]
- Boundary between forest and agric. 1972 \_\_\_\_\_

P A C I F I C O

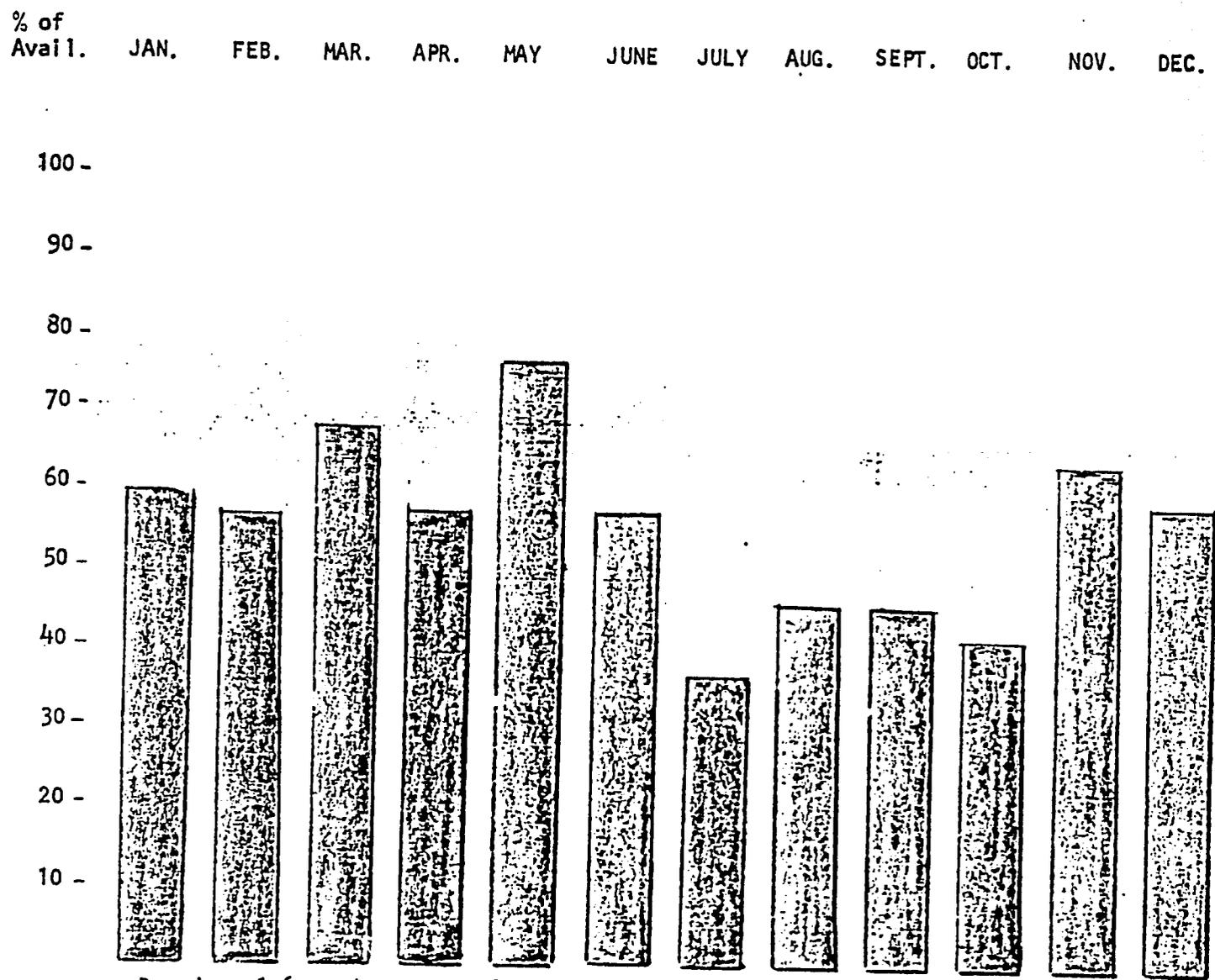


ANNEX VI  
MAP - No. 10



TONOSI--Land with legal titles within perimeter of former United Fruit Company land.

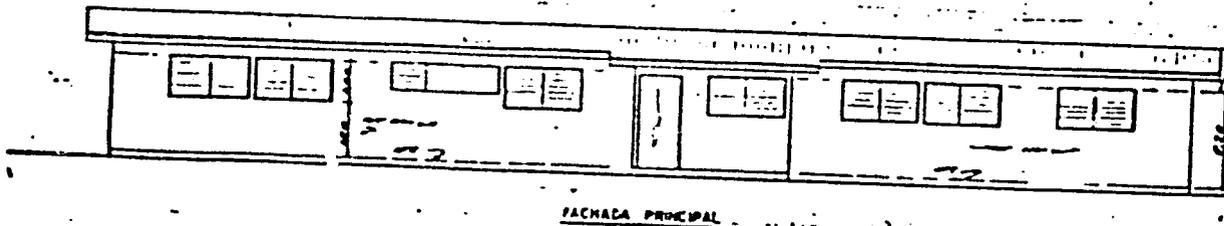
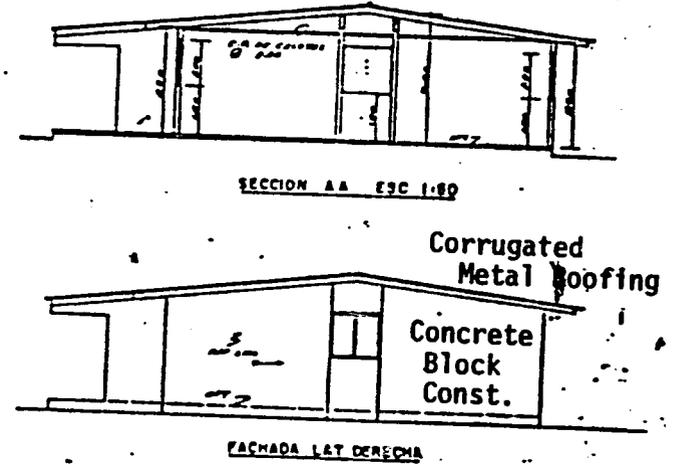
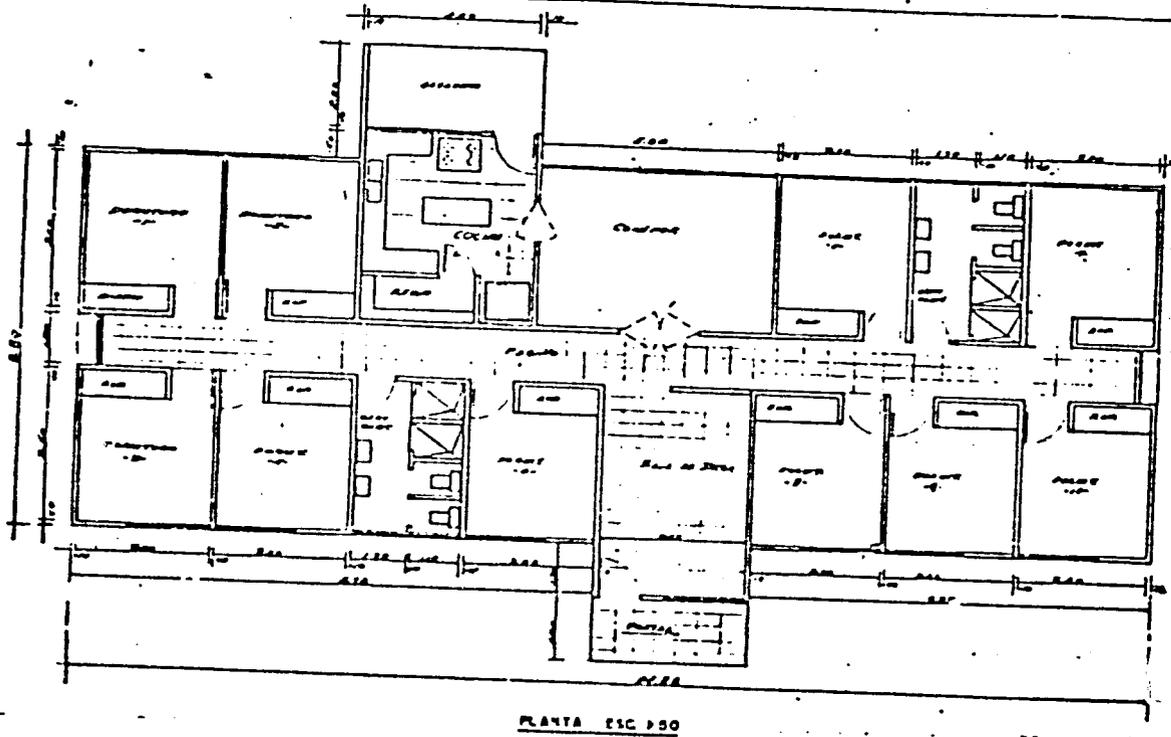
TONOSI: Projected Aggregate Labor Requirements of Participant Farms, by Months as Percent of Availability, Year 5.



Based on 1.6 man/years per family at 250 days per man/year.

TONOSI: SKETCH OF PROPOSED PROJECT STAFF FACILITIES

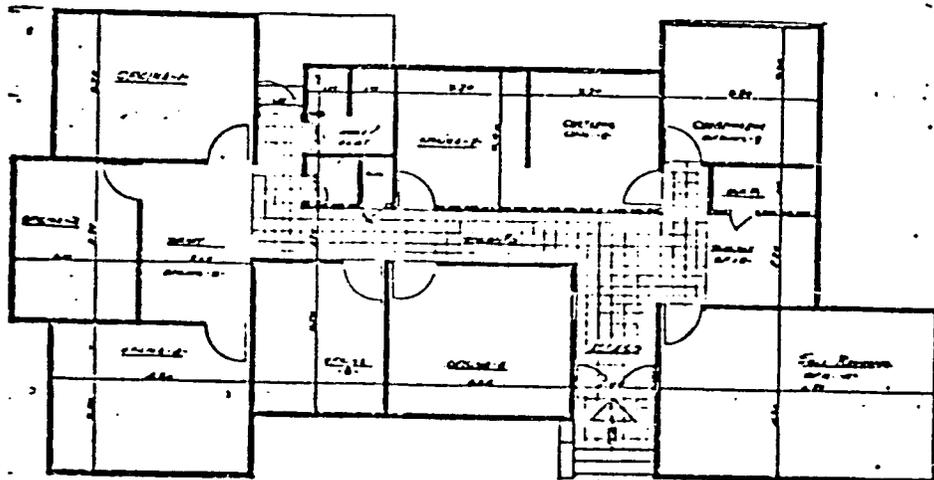
ANNEX VI  
Figure 2



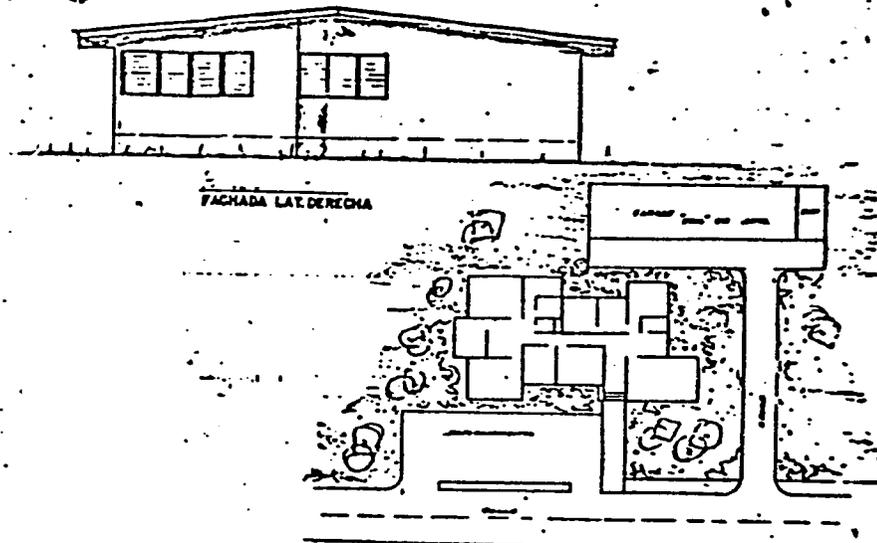
MINISTERIO DE PLANIFICACION Y POLITICA ECONOMICA	
PRINCIPAL	
Ante-Proyecto de local para alojamiento de los funcionarios del proyecto de Desarrollo Rural en la zona de Tonosi. (Caso 20 comas)	
Dis. GNC	
Fecha 21-10-76	

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TONOSI: SKETCH OF PROPOSED PROJECT OFFICES

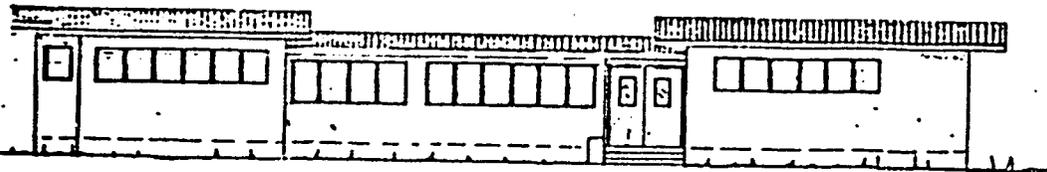


PLANTA RECIBO



LOCALIZACION

AREA DE CONST. 200 m²



FACHADA PRINCIPAL

MINISTERIO DE PLANIFICACION Y POLITICA ECONOMICA	
PROYECTO	
ANTI-PROYECTO PARA LAS OFICINAS DEL PROYECTO DE DESARROLLO RURAL INTEGRADO DE TONOSI.	
DISEÑADO POR	
FECHA	10-11-70

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ENVIRONMENTAL EXAMINATION

Project Location: Tonosf District, Los Santos Province, Republic of Panama

Project Title: Integrated Rural Development Project

Funding: FY 77 US \$9,700,000

Life of Project: 5 years

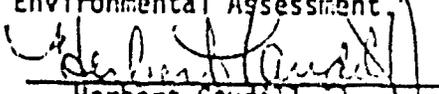
IEE Prepared by: Herbert Caudill, Jr., Environmental Engineer, USAID/Panama

Date: August 15, 1977

Threshold Decision

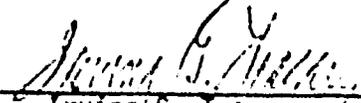
A. Environmental Action Recommended

I recommend that based upon the initial Environmental Examination for the proposed action that a negative determination and decision be made as follows: "The proposed action will not have a significant effect on human environment and therefore does not require an Environmental Impact Statement or an Environmental Assessment."

  
Herbert Caudill, Jr.  
August 17, 1977

B. Concurrence

I, Irving G. Tragen, Mission Director, concur in the above recommendation.

  
Irving G. Tragen  
August 17, 1977

I. Examination of Nature, Scope, and Magnitude of Environmental Impacts

A. Description of Project:

The Integrated Rural Development Project attempts to improve the overall living conditions of the lowest-income people in selected rural areas of Panama fundamentally by providing them with a viable resource base and rationalizing utilization of natural resources and human employment. This first installment of the overall effort will concentrate on the Tonosí District, in the Province of Los Santos. The basic objectives for the development of the district of Tonosí are to provide minimum family income earning opportunities of \$2,000 per family for approximately 1,000 families. The companion objective is to provide the minimum economic and social infrastructure required to make the on-farm investments viable and establish living conditions in the area which respond to the felt needs of the target population in terms of health and educational services. In this manner it is expected that in the short run the existing population can be encouraged to remain in this relatively underdeveloped but promising area, and in the longer run surplus population from neighboring districts can be attracted.

Currently applicable programs of several agencies of the Government of Panama will be brought to bear on the Tonosí District (Health, Education and Housing). These components are funded from other sources, and their environmental effects have already been considered in other documents.

The Government of Panama agency which will have overall responsibility for planning, coordinating and administering the activities to be funded by this project is the Ministry of Planning and Economic Policy (MPPE). Field implementation will be the responsibility of the Ministry of Agricultural Development (MIDA). Following is a brief summary of the activities which will be carried out under the proposed loan project in the Tonosí District:

1) Reforestation: Through the practice of "slash and burn" agriculture, the Tonosí environment has progressively deteriorated, as increasing areas of tropical forest slopes have become denuded and exposed to erosion. The project will attempt to reforest at least 1,500 hectares. Along with the reforestation efforts will be a stepped-up education, control and enforcement program to stop the deforesting and burning of those hillside areas that are still covered with forests.

2) Access Roads: A number of villages in the Tonosí District still have very poor access to shopping, marketing and other community

facilities. Many of the existing roads are impassable in the rainy season. Existing roadbeds will be regraded, widened and gravel surfaced, and some will be raised, in order to make them all-weather roads and thus establish year-round connection with the village of Tonosf and the outside world.

3) Storage Facilities: Modest facilities for storage of agricultural products, inputs and farm machinery will be constructed near the village of Tonosf.

4) Crop Production: During the life of the project, commercial crop production will be essentially limited to products already being grown in the area (e.g., rice, corn, plantains and tomatoes). Both area and yields will be increased through provision of improved technology, inputs, machine services and credit, and commercial cropping will be limited to alluvial valley soils.

5) Livestock Production: Through the establishment of better pastures and forage conservation and improved cattle and technology, milk production and productivity will be raised to a level consistent with the capabilities of the land. Sloping land will be utilized for cattle grazing.

6) Flood Control: A modest program of flood control, limited to the clearing of river channels and the implementation of soil conservation techniques, will be established, in conjunction with the longer-term protection to be provided by the upstream reforestation.

B. Identification and Evaluation of Environmental Impacts of Subcomponents:

1) Reforestation: The reforestation component of this project attempts to reverse a trend of environmental degradation caused by primitive slash-and-burn technology. This primitive pattern was due to a combination of land tenure problems, technological ignorance and absence of public services such as technical assistance, credit and enforcement of forest protection laws. This encouraged subsistence farming in virgin forest and the subsequent turning of this land into low-grade (and typically overgrazed) pasture. Excessive runoff, erosion and flooding resulted. The project attempts to reverse that pattern through a process of education, through better control and law enforcement, and through reforestation of selected slopes that are marginal for crops or grazing, all based on the provision for project participants of adequate areas of land capable of sustained crop or grazing use under normal conservation practices without risk of degradation. The net effect will be to re-establish a better ecological balance, as well as to provide for future generations resources that,

## ANNEX VII

## Page 4

with proper management, can last indefinitely. The net effect of this component will be to demonstrate, in a very limited area, steps which can be taken to mitigate the negative environmental effects of the current practices.

2) Access Roads: Provision of all-weather roads will materially improve the human environment, not only for economic activity but also access to essential public social services such as education and health. The road program is also designed to support the more rational use of land discussed above. The regrading and introduction of culverts will protect areas now subject to erosion. The roads will not affect what is left of the natural environment since they will follow existing alignments.

3) Crop Production: Except for a handful of (partly absentee) commercial farmers cultivating about 1,000 hectares of bottom land, crop production is presently practiced largely on hillsides by potential project participants, resulting in low-land and labor productivity and aggravating the erosion problems. The project contemplates a shift in the land use pattern (including land tenure adjustments as required) which will bring into cultivation a substantial acreage of fertile alluvial land currently in extensively managed cattle pasture, at the same time as marginal hillside cropland is taken out of crop production. The effect on the human and natural environment will be beneficial. Farmers now apply pesticides in whatever quantities seem appropriate to them. With technical assistance readily available, it is expected that pesticides will be applied in a more rational manner. No new chemicals will be introduced that are not currently in use. Furthermore, Panamanian law requires that no chemical can be introduced which is not approved in the country of origin.

The raising of cattle will be shifted to areas of medium elevation in order to use the lowlands for crops. Pesticides will not be applied in the cattle grazing areas, thus practically assuring the absence of residues in milk.

Technical assistance advisors to MIDA will further train Panamanians in the proper use and control of pesticides. AID regulations governing the use of pesticides will be followed.

4) Livestock Production: The present patterns of livestock production on the steep slopes that occupy a large percentage of the area tend to damage the environment. Farmers place an excessive number of animals on the land, causing overgrazing, with consequent degradation. The project will encourage more rational land management, including the removal of cattle herds from grazing of hillsides to be reforested. The proposed action would reverse the environmental deterioration process.

5) **Flood Control:** As mentioned earlier, progressive deforestation has aggravated the problems of seasonal flooding over the years. To complement the reforestation efforts, certain low-cost attempts to partially control flooding will be made, such as clearing obstructions in the river channels, and introducing better on-farm drainage practices. No construction for major water storage is contemplated during the life of the project.

C. Narrative Description of Environmental Impact Identification and Evaluation Form:

- 1) **Land Use:** Little environmental impact is assessed to "increasing the population". Overall density is relatively low at present and the local distribution of people with respect to land resources will be improved by the project. The project will encourage people to stay in the Tonosí District rather than to migrate to impacted urban areas. This will entail a hardly perceptible increase in the density of population during the life of the project. The item, "changing soil character", has received a "Moderate" rating because, if no action is taken, the soil will continue to deteriorate for the reasons discussed above, and project implementation is designed to reverse the process of soil degradation.
- 2) **Water Quality:** Due to heavy erosion, surface runoff presently contains large quantities of sediments. It is anticipated that through proper river basin management practices instituted through this project, erosion will be reduced, and the quality of surface waters improved. Restoration of some of the ecological balance that once existed in the tropical forests is anticipated. No change in the chemical or biological state of the water is foreseen.
- 3) **Atmosphere:** The project should have some positive effect on the atmosphere as air pollution is reduced through a reduction of indiscriminate and widespread annual burning which is at present part of the slash-and-burn agricultural pattern. There will be no other significant atmospheric effects.
- 4) **Natural Resources:** An "L+" rating is given to "Diversion, altered use of water", because there will be gradual efforts to reduce water velocity and runoff. No irreversible, inefficient commitments are foreseen.
- 5) **Cultural, Socio-Economic:** A highly positive socio-economic effect is expected as higher incomes and more opportunities for employment, education, and health for the lowest income strata within the District are created, with their active participation. A side-effect will be that emigration to the towns will be slowed.

ANNEX VII.  
Page 6

6) Health: A positive impact is expected on the health of the population through the institution of environmental health practices, such as the construction of safe water supplies and latrines, and better access to the District health center.

7) General: There are no international or controversial impacts foreseen. When the GOP attempts to replicate the project, similar benefits are expected to accrue to other locales. Steps will be taken to assure that there will not be any adverse environmental effects in similar AID funded projects.

Recommendations for Environmental Action:

The components which form this project do not have a significant effect on the environment. Therefore, no further environmental action is recommended.

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IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-Areas

Impact Identification  
and Evaluation

A. LAND USE

1. Changing the character of the land through:

- a. Increasing the population----- L
- b. Extracting Natural Resources----- N
- c. Land clearing----- N
- d. Changing soil character----- L

2. Altering natural defenses----- N

3. Foreclosing important uses----- N

4. Jeopardizing man or his works----- N

5. Other factors

----- N

-----

B. WATER QUALITY

1. Physical state of water----- L

2. Chemical and biological states----- N

3. Ecological balance----- L+

4. Other factors

----- N

-----

C. ATMOSPHERIC

- 1. Air additives----- L
- 2. Air Pollution----- N
- 3. Noise Pollution----- N
- 4. Other Factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

D. NATURAL RESOURCES

- 1. Diversion, altered use of water----- L+
- 2. Irreversible, inefficient commitments----- N
- 3. Other factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

E. CULTURAL

- 1. Altering physical symbols----- N
- 2. Dilution of cultural traditions----- N
- 3. Other factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

F. SOCIOECONOMIC

- 1. Changes in economic/employment patterns----- L
- 2. Changes in population----- L
- 3. Changes in cultural patterns----- N
- 4. Other factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

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G. HEALTH

- 1. Changing a natural environment----- N
- 2. Eliminating an ecosystem element----- N
- 3. Other factors
- \_\_\_\_\_
- \_\_\_\_\_

H. GENERAL

- 1. International impacts----- N
- 2. Controversial impacts----- N
- 3. Larger program impacts----- N
- 4. Other factors.
- \_\_\_\_\_ N
- \_\_\_\_\_

I. OTHER POSSIBLE IMPACTS (not listed above)

- \_\_\_\_\_ N
- \_\_\_\_\_
- \_\_\_\_\_

Explanation of codes:

- N- No environmental impact
- L- Little environmental impact
- M- Moderate environmental impact
- H- High Environmental impact
- U- Unknown environmental impact
- + Positive impact on the environment
- Negative impact on the environment