

CLASSIFICATION  
**PROJECT EVALUATION SUMMARY (PES) – PART I**

Report Symbol U-447

<b>1. PROJECT TITLE</b>  SMALL FARMER DEVELOPMENT LOAN 514-T-080			<b>2. PROJECT NUMBER</b> 514-0203-100-000	<b>3. MISSION/AID/W OFFICE</b> USAID/Colombia
<b>4. EVALUATION NUMBER</b> (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) X Final Evaluation.				
<input type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION				
<b>5. KEY PROJECT IMPLEMENTATION DATES</b> A. First PRO-AG or Equivalent FY <u>76</u> B. Final Obligation Expected FY <u>80</u> C. Final Input Delivery FY <u>80</u>		<b>6. ESTIMATED PROJECT FUNDING</b> A. Total \$ <u>3.4 million</u> B. U.S. \$ <u>1.284 million</u>		<b>7. PERIOD COVERED BY EVALUATION</b> From (month/yr.) <u>May/79</u> To (month/yr.) <u>May/80</u> Date of Evaluation Review <u>June 1979</u>

**8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR**

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIQ, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
Final Evaluation  No Actions Required		

<b>9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS</b> <input type="checkbox"/> Project Paper <input type="checkbox"/> Implementation Plan e.g., CPI Network <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Financial Plan <input type="checkbox"/> PIO/T <input type="checkbox"/> Logical Framework <input type="checkbox"/> PIO/C <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Project Agreement <input type="checkbox"/> PIO/P	<b>10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT</b> A. <input type="checkbox"/> Continue Project Without Change B. <input checked="" type="checkbox"/> Change Project Design and/or <input type="checkbox"/> Change Implementation Plan C. <input type="checkbox"/> Discontinue Project
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<b>11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)</b>  David H. Schaer/ARDO <i>DHS</i> Neil B. Billig/Evaluation Officer <i>NB</i>	<b>12. Mission/AID/W Office Director Approval</b> Signature _____ Typed Name <u>Jerry B. Martin, AID Rep.</u> Date <u>June 19, 1980</u>
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### 13. SUMMARY

#### a. Background

Prior to undertaking the project, the Mission contracted a profile of rural Colombia performed by Leonard Kornfeld. The study proposed that small farmers in Colombia could be efficient allocators of resources and if provided with adequate tools such as appropriate technology, inputs, credit, and marketing, could substantially increase their production, net income, quality of life, and provide increased food supplies to the country.

Based upon the above rationale a loan project was designed to provide the small farmer with the improved technology needed to improve his income. The project should have and could have been very innovative. However, ICA, the implementing institution, was not involved with the project design and refused to implement the original plan. There was little or no pressure from DNP, MOA or organized small farmer groups to force ICA to change its orientation and accept a project approach which was, in effect, experimental.

The loan was developed as part of the Mission's phase-out program and in retrospect it is clear that it should have been a grant pilot project. The GOC, in this case ICA, simply was not willing to use loan funds for the high risks envisioned under the original project concept.

During the early stages of implementation when CP's were being met, the Mission did not take the difficult management decisions necessary to maintain the project rationale and accepted an unworkable management system and plan which permitted the project to be implemented through the traditional and cumbersome ICA bureaucracy.

In spite of the above, the project continued nearly 3 years with the Mission hoping to salvage part of the original intent. The Mission believed that appropriate technical assistance could rectify the deficiencies noted above.

In 1977 AID re-issued policy statements requesting that the Borrower perform its own loan financed contracting whenever possible. The Mission failed to make the determination that ICA was not competent to contract T.A. After two years without results, ICA requested that USAID/C contract the technical assistance for them. An appropriate T.A. package was put together in December, 1979 but the ICA Board of Directors disapproved it in February, 1980. (See details in Annex 1). The Mission immediately terminated the loan and deobligated the remaining funds.

b. Status

The following describes the plan that ICA attempted to implement during the project:

A series of activities (sub-systems) were undertaken to develop a process/way (methodology) by which the constraints on small farmer income and productivity could be identified and overcome in any specific geographic region of Colombia.

Work was carried out in South Huila, North Santander and South Guajira on the following 5 sub-systems designed to:

1. Describe and analyze the small farmer, his strengths, weaknesses, technology, and problems;
2. Conduct adaptive research directed toward development of appropriate small farm technology;
3. Devise methods of delivery of critical services including agricultural technology and risk aversion schemes to small farmers;
4. Encourage local small farmer organizations to assist in the functioning of "2" and "3" above; and
5. Evaluate and monitor all project activities.

During the project, ICA made advances in the improvement of their technology generation and transfer methodology, to make it more appropriate to solving small farmer problems. Methodologies for Desk Analysis, Field Analysis, Farmer Information, Field Trials, Communication, Technology Transfer, Production, Marketing and Evaluation were developed and are being used in locations throughout Colombia, particularly in relation to the 300 million dollar GOC Integrated Rural Development (DRI) program. Two of the methodologies are in use in Bolivia and Ecuador.

In spite of the above, the main result has been that without adequate technical assistance ICA continued operating in isolation without considering agricultural technology already proven in other countries. The methodologies developed for this project are traditional and cumbersome instead of innovative and simple.

The project purpose was not attained and future impact will be limited.

#### 14. EVALUATION METHODOLOGY

All project sites were visited and extensive interviews were held with project technicians, farmers and related personnel. Additional information was gained by analysis of documents produced by the project.

A special analysis regarding generation and transfer of technology was made by Dr. Peter Hildebrand during three TDY's in 1979 and 1980 and is incorporated into this evaluation. Following a description of the project, an analysis of the quality of achievement measured against the Project Paper, including an actual end-of-project status, is made in subsequent sections.

Personnel involved in the evaluation include the USAID/C evaluation officer, the USAID/C Project Manager, the ICA project manager, his superiors in the ICA organization responsible for the project, district directors of three districts in which the project has field operations, and technicians at both national and district level who worked on the project. USAID and ICA senior management participated in the final discussions and development of conclusions.

#### 15. EXTERNAL FACTORS

The major external change affecting project performance was the continual shrinkage in real terms of the ICA budget and the consequent loss of trained staff. Throughout the life of the project ICA did not enjoy good financial support and was constantly losing personnel to the private sector, other institutions, and to international projects.

There were problems in arranging international travel for ICA personnel to achieve the technical interchange designed in the project. The ICA Board of Directors did not approve essential technical assistance, and a strike at the Ministry of Finance delayed distribution of the vehicles for 6-8 months after their arrival in mid-1979.

Three of the assumptions under outputs (C.4) have proven invalid.

- a) "Qualified technical advisors will be available".
- b) "Inputs will be available in a timely fashion"
- c) "An effective 2-way communication system can be established between technicians and small farmers." This assumption could still be valid, but not with the methods ICA currently uses.

J. K. McDermott of AID/W/DS/AGR who helped with the 1979 project evaluation observed that many of the assumptions for Purpose and Output seem to be either (1) a condition to be provided by management or a project output, or (2) the assuming away of a significant constraint.

16. INPUTS

FINAL PROJECT INPUT TOTALS (5/10/80)  
(US\$)

	<u>USAID/C</u>	<u>ICA</u>
Local costs	\$ 1,853,449	\$ 794,335
Technical Assistance	111,217	-0-
Technical Interchange	-0-	-0-
Commodities (vehicles & Motorcycles)	<u>192,915</u>	<u>-0-</u>
	<u>\$ 2,157,581</u>	<u>\$ 794,335</u>
Budget Original Loan	\$ 3,400,000	\$ 1,283,700

The only AID input possible for the first two years of the project was local costs. Technical Assistance was not provided due to ICA's resistance to using non-Colombian technicians and the complex AID and Colombian regulations regarding contracting. Procurement of vehicles and motorcycles was bogged down with similar procedures and the Minister of Agriculture regarded all attempts at technical interchange as "Tourism".

At about the 28th month of the 36-month project, one technician arrived (IICA) to provide technical assistance in marketing. Six months later a technician arrived to help with evaluation. However, neither of these areas were critical to project success.

This lack of basic technical assistance and technical interchange was serious, and to a great extent caused by ICA's reluctance to employ non-Colombian technicians. It was decided in May, 1979 that if the project could not get technical assistance in farm management, including record keeping and farm management surveys, it would be severely limited in its impact. A history of the attempt to get this technical assistance is presented in Annex 1. The purpose of the proposed technical assistance is discussed in Section 17.

The vehicles were 22 months in arriving and upon arrival were caught in a Customs and Ministry of Economy Strike (Nov. - Dec., 1979). Due to the paper backlog caused by the strike, it took 4 months to get the port and customs documents processed (January - April, 1980). ICA then prepared financial contracts for those technicians who will receive vehicles (May, 1980) and they have been notified that when they pay their initial quota they will receive the vehicle. This means that no project financed transport was available during the project.

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The project did make creditable progress in achieving outputs having to do with description of areas in which field activities were sited; including, the development of methodologies for using secondary data supplemented by visual surveys and limited farmer interviews. These methodologies can be easily transferred to other ICA areas. Progress has also been made in adaptive research (pruebas de ajuste). The above has given ICA considerably improved knowledge of its clientele, and can be considered a significant achievement.

Much less progress was made in developing methodologies for data collection and analysis that would lead to a better understanding of the farmer as a means of identifying and evaluation constraints that could be used for developing a technology strategy. A methodology for collecting information (ficha técnica) was developed and modified but still requires improvement. Some work was done with groups and in the delivery of critical services, but no significant innovative methodologies were identified.

One thing observed repeatedly during the project and during the final evaluation was that several district technicians were engaged in traditional extension functions, the Veterinarian was vaccinating and treating animals and the Home Economist was working with nutrition, home gardens, sanitation, etc. While these activities are very necessary, it was the intent of this project to use these skills as part of a multidisciplinary team who would develop and refine the process for identifying and overcoming constraints to the small farmers productivity and increased income. The Mission feels that technical assistance, such as the type envisioned under Dr. Peter Hildebrand, would have focused these technicians in a way consistent with project objectives and they would not have drifted into traditional extension activities.

The following is the activity status as of the TDD of the project (May 10, 1980) using as a base the Log Frame outputs: "A process by which the constraints to small farmer development can be identified and overcome..." To this end the project will develop the following:

A. Sub System A: "A cost effective methodology for describing and analyzing the small farmer".

1. Activity

Status 5/10/80

(a) Desk Analysis

(a) Analysis were made of three pilot areas and were used to select specific work sites.

A Methodology Guide was prepared, tested by field personnel of non-AID districts, and revised to facilitate field implementation. This is a positive and satisfactory achievement.

(b) Field Analysis

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| (1) Determine importance of major crops and major livestock activities in area, related to ecological characteristics  | (1) A <u>methodology</u> was developed and tested involving national, regional, and local ICA personnel in a reconnaissance of the area.   |
| (2) Identify technologies being used for each crop and livestock activity. (ICA calls this " <u>sistemas de produccion</u> ".)   | (2) A simplified <u>methodology</u> of farmer interviews was developed.  |
| (3) Technology Inventory (of ICA institutional technology) Note: ICA implementation plan lists this under "desk analysis", but it occurs in "field analysis".            | (3) A <u>methodology</u> was developed for seminars and conferences of ICA researchers and field personnel to determine what it is that ICA know that could probably help local farmers. This methodology produced tentative recommendations called " <u>first approximations</u> ". |
| (4) Detailed analysis involving factor-factor comparisons, factor-product relationships, and efficiency of production on a statistical sample representing the universe. | (4) <u>Methodologies</u> have been developed. One is the " <u>Ficha Técnica</u> ." A schedule or form intended to collect all data needed for farm analysis, plus that needed for social analysis. A follow up form, called "Hoja de Seguimiento", was also developed.               |

An analytic methodology, called "Heads and Tails analysis" was devised to identify best local practices for use in extension. This methodology has been revised with considerable improvement, however, final analysis

has resulted in abandoning it as a tool for field use. The primary reason was lack of accurate data. (Garbage in, garbage out).

Various other methodologies, such as partial budgeting, have been used with adaptations.

(5 ) Describe marketing systems.

(5) Descriptions have been made using conventional methodology.

#### Comments on Status of Field Analysis

(a) Real progress has been made in points 1, 2, and 3 above, i.e., learning what the farmer produces and what technology he uses in producing it. This has enabled ICA to improve its programming significantly, within its commodity constraint.

(b) The Ficha Técnica (point 4 above) as a data gathering device has been a virtual failure. It is applied to all ICA usuarios. This causes the handling of much more data than is needed and yet is not representative of the majority of small farmers. The Ficha Técnica takes too much time and resources, does not present accurate data, does not present data in the form needed, and does not collect some important data. ICA modified this data system to a degree in 1979. The modified version is simpler, and a follow-up procedure known as seguimiento has been established. This latter procedure closely resembles the farm record project which was proposed in the sub-project planned for 1980/81.

What is needed is a rapid and efficient survey technique that will provide sufficient information on what the farmers do, how they do it, and, most importantly, why they do it the way they do. Such analytical technique could allow the technicians working in the area to orient the farm trials, which would then serve to compare proposed technology with that currently being used. ICA recognizes that it does not now have a procedure for learning why farmers do what they do, and see this as an important omission in their methodology. The Sondeo procedure developed and now popular in Guatemala was proposed as a substitute for seguimiento. Although

this system does not differ in great detail from the present seguimiento procedure, it has proven very functional in Guatemala because of its low cost and efficiency. High quality information for decision making at the field level is obtained in one week and the format it uses has been incorporated into an existing program for the TI-59 programmable, hand-held calculator that makes analysis of the data possible in the field, without the need for centralized data processing, centralized processing is another traditional ICA procedure that inhibits direct participation in technology generation by field staff.

(c) Inadequate progress has been made in the methodology of identifying farmer constraints. Although individual field workers have identified constraints and reacted to them, a systematic methodology has not been developed.

(d) Field analysis was the critical focus of the project. This objective was not developed successfully due to the lack of appropriate technical assistance.

(e) Technical assistance would have provided an alternative to the "heads and tails" analysis. As part of the sub project planned for 1980 and 1981, loan extension of the loan extension sub-project planned for 1980 and 1981, ICA was to have used hand-held calculators to analyze most of the field data, including field trials. This innovation had three important implications. First: it simplifies procedures and experimental designs so they can be used and understood by field staff, not only by the central statistics staff. Second: it gives the opportunity of data analysis to the same staff that designed and conducted the farm trials, which contributes directly to understanding the implications of the results. Third, it very significantly reduces the time between data collection and analysis, so that results from trials in one season can be utilized immediately in the following season. The present system in use in ICA does not permit this. Accordingly, new trials are planned without appropriate information from previous trials. This problem often leads to an increase in time and cost required to produce a specific technology recommendation.

B. Sub System B: "A system for conducting research on small farms to determine what technology needs ought to be the subject of research and what technology is ready for diffusion."

1. Activity

Status 5/10/80

(a) Agricultural Research

(a) A Methodology has been developed by which field or extension personnel do ecology-specific testing and adaptation (pruebas de ajuste). Central and Regional personnel provide technical counsel. This research results in "adjusted technology" i.e., modification in the "first approximation" recommendations made by ICA upon identifying local technology. An example of a prueba de ajuste is in Annex 2.

(b) Communications Research

(Note: This is more relevant to Sub-system C than to B)

(b) Communication research has been carried out on specific communications methodologies. Some new information has been gained, but it has not been put into methodologies yet.

(c) Mechanization and Processing Research

(c) Project funds have been used to continue a line of research initiated well before the project. Need for and design of this research was established before the project. Although it has not been effectively delivered to the farmer, several field programs are operational to do so at this time.

2. Comments on Status of Sub-System B

There have been useful results from on-farm research. There has been little progress in tested, systematic methodologies. In general ICA took its experiment station methodology to the field. Some individual field workers have adjusted the methodologies, but these have not been adequately tested, codified, and put in form that is teachable and transferable through the ICA system. On-farm adaptive research by field workers

used to modify standard recommendations may turn out to be a significant project achievement. It is too soon to predict its institutionalization. Impact will be restricted by ICA's rigid commodity orientation.

Appropriate technical assistance could have improved this sub-system (particularly A & B above) by making an adjustment in the orientation of the technology to be tested in the farm trials. At present this orientation comes almost exclusively "down from the top" in a commodity by commodity approach. That is, ICA uses what is called a "first approximation" that comes from their "market basket" of presently available technology. Although some progress has been made to maintain crop associations in field trials (multiple cropping), this procedure has two negative effects which would have been corrected if appropriate technical assistance had been available.

These are: 1) It inhibits initiative and imagination on the part of the technicians who know most about farmers' conditions in the project area, those who are going to conduct the trials; and 2) the technology tested tends to ignore interactions among associated crops as well as with other enterprises on the farm. That is, it ignores the complete farm picture. A further characteristic of top down technology is that it is usually based on the concept of unlimited resources. This characteristic never applies to the small farmer and the result is that the technology tested simply is not appropriate for the clients' conditions.

To resolve this conflict, it was recommended that the same team that conducts the survey be the one to design the trials including the construction of the treatments (technology) to be incorporated in them. This does not imply a divorce from technology that is already developed nor from advice from national level scientists, both of which can be called upon as necessary and desirable. But it allows the on-site technicians to use their own imagination and initiative in responding to their understanding of the farmers' needs and problems.

The communications sub-activity has devised a methodology for interventions to help the transfer of technology. The methodology has been transferred from Colombia to Ecuador, Bolivia and Venezuela. District personnel have been very satisfied with communications support from the national level.

C. Sub System C: "A methodology for identification of cost effective delivery services to supply small farmers with critical goods and services". (Sub-System C in PP).

1. Activity

Status 5/10/80

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| <p>(a) Transfer of technology.<br/><br/>(Plan indicated nothing beyond conventional extension).</p>   | <p>(a) Only a few examples have been reported in which technology improvements under this project have been extended successfully at this time.<br/>(Sugar cane for <u>panela</u>, yuca, beans, corn, and tomatoes).<br/>(See Annex 3).</p>   |
| <p>(b) Production Plan<br/><br/>(This is the terminology used for an extension program with other agencies, such as credit, improved seed, marketing, etc.)</p> | <p>(b) Some field teams have devised production plans. However, there are no guidelines that have been tested for field use in designing such plans. Such a methodology is currently being field tested but has run into considerable debate and disagreement within ICA.</p>   |
| <p>(c) Marketing<br/><br/>(To be accomplished by groups similar to cooperatives, organized around production plans).</p>  | <p>(c) Some <u>ad.hoc</u> work with groups has been done. One group has organized a "<u>Botiquin Veredal</u>" to provide drugs for livestock. Reports are that <u>panela</u> producers of Huila are being organized to market increased <u>panela</u> production and ASAPAPA (now AGROPAPA) was formed and is helping potato producers. Consideration is being given to organizing <u>Yuca</u> producers in the Guajira to process <u>yuca</u> into starch as a means of marketing production. Few new methodologies exist. ICA has had a technician working with the project on marketing for over one year. He has moved slowly because traditionally marketing has not been an ICA function. An evaluation of that work in February, 1980 indicated that he was making good progress particularly in getting the ICA technicians</p> |

and management to view the importance of marketing in the overall small farm problem. This was confirmed during site visits. Several specific projects were undertaken by ICA.

1. Activity

(d) Risk

Status

(d) The implementation plan also discussed risk as a major problem, but presented no plan to deal with it. However, a plan called "risk sharing" has been used. It is simply that a farmer does not have to pay back his loan for inputs unless his production surpasses a certain level. In practice, this is not risk sharing. It is simply a transfer of risk to ICA. Given the problem of measuring production, ICA has assumed more risk than the farmer incurred. (Current repayment runs 67%).

2. Comments on Sub-System C

While there has been considerable activity in this area, it is difficult to identify activities that are innovative or lead to new methodology. No methodologies of any consequence have been developed, tested, and published. There have been academic type publications and conventional research.

The ICA implementation plan did not reflect the full range of activities anticipated in the project design and lack of technical assistance prevented activity adjustments during the project.

D. Sub System D: "A method for encouraging the participation of existing small farmer organizations in the delivery of critical goods and services and the design and adaptation of technology to small farmer conditions".

<u>1. Activity</u>	<u>Status</u>
(a) Socio-economic research from <u>Ficha Técnica</u> and additional information on <u>usuario</u> and his family.	(a) Characterizations have been done on the basis of the total number of farmers cooperating with the ICA from <u>Ficha Técnica</u> data.
(b) Motivate <u>usuarios</u> to participate in Groups.	(b,c,d) There has been considerable activity in working with groups, and some experimenting with special interest vs. general interest groups and with an <u>ad hoc</u> vs. permanent groups. Use has been made of chartered groups, such as <u>Acción Comunal</u> , but more for the legal status involved than for the membership involved. ICA groups consist mainly of its <u>Usuarios</u> , a small and privileged Group.
(c) Support organization of new groups, and improvement of existing groups.	
(d) Use groups for technical assistance and for project decisions.	

2. Comments on Sub-System D

(a) There is not enough distinction between sub-systems C and D in either the implementation plan or the implementation to consider them as two systems. In fact the distinction may have been too precise in the original design.

(b) ICA has implemented the plan accepted by USAID which was neither imaginative nor innovative and did not fully reflect project design. The plan did not include adaptation of such standard techniques as those dealing with group dynamics and identification of leaders.

(c) An important obstacle to progress in this area of work is the ICA tradition of working with usuarios, often on a one-on-one basis. This factor was not addressed, either in the project paper nor the ICA implementation plan. The usuario often receives credit and always some special attention. This puts him in a privileged class that does not quite represent the small farmer. Yet in practice, if not in theory, ICA tends to consider this group its complete clientele.

(d) No technical assistance input nor technical interchange was accepted by ICA to help them see and develop alternatives to their own tradition. See Annex 1 for details.

(e) With 2-3 more years in the project, these combined sub-systems would have warranted attention, with emphasis on groups. Pay off possibilities would have been limited by the inadequacies of sub-system A, which should have received first attention.

E. Sub System E: "An evaluation/information system to provide corrective guidance to the project as well as to measure and ascribe success to project components.

<u>1. Activity</u>	<u>Status</u>
(a) Final evaluation and analysis.	(a) USAID/C is completing an evaluation with assistance from the ICA project manager and field staff. They are providing project related information and materials.
(b) <u>Partial Evaluation</u>  The plan is vague and difficult to follow. It mentions "the need for a Unit of Evaluation" but assigns responsibility throughout the system to the Planning Evaluation Units in each district and to two divisions of the Central Office.	(b) There is no visible evaluation and monitoring unit. There are some activities such as the evaluation of an idea by a single field technician, and evaluation seminars of several days duration by district, regional, and national personnel. The <u>Ficha Técnica</u> was an idealized monitoring device. It has not been successful. ICA realizes it and knows what is wrong with it, but it apparently does not want to correct the problems.

2. Comments on Status of Sub-System E.

(a) Lack of an effective evaluation system within the project prevented early diagnosis of deficiencies such as the commodity (crop) orientation, the inadequate information feed-back system, and the fact that ICA was working in isolation with little or no innovation. Project accomplishment was directly impeded by inadequacies in this sub-system.

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(b) In the sense of having a formal information system to provide continual monitoring, efforts have produced little of value, have been very costly, and offer little chance of being used throughout the ICA system.

(c) In August, 1979 an IICA evaluation specialist began working in two of the Districts. Field visits showed that time had been too short to show any effect at this time.

#### General Evaluation Comments

(a) AID accepted an implementation plan submitted by ICA that was deficient. The deficiencies were recognized in a memo by Dwight Steen, principal design officer, in August, 1976, and confirmed in the 1978/79 evaluation.

(b) ICA operates under some severe constraints, imposed by its own traditions, that the project did not explicitly address. One of these is its strict commodity (crop) approach which limits the technology alternatives it has at its disposal for recommendation to small farmers. The other is its concentration on a small group of usuarios which receive services simply not available to small farmers as a class. This two-fold restriction of its felt responsibility and of its range of alternatives, has contributed to the lack of understanding of small farmer constraints and the failure to address them adequately. For example, capital is correctly recognized as a constraint. For its small group of usuarios ICA can arrange credit at subsidized interest rates (and free technical assistance) and thus relax this constraint. By relaxing this constraint ICA can deal in technology that requires more capital than most small farmers have. ICA's responsibility is to generate technology that can operate within this constraint. This is made more difficult than it needs to be by ICA's dealing in individual commodities. The original project design proposed substantial technical assistance to deal with the problem of commodity orientation and identification of the target group.

(c) ICA has worked on this project in complete isolation. Because they did not have technical assistance (See Annex 1 ) and because the Ministry of Agriculture disapproved all technical interchange trips, they did not take advantage of experience elsewhere in the world that would have helped it break through its own constraints. Technical assistance was only provided in marketing and evaluation.

(d) Given the above constraints ICA field personnel have done a good job, and some of its personnel have performed admirably. However, the project purpose was not achieved.

## 18. PURPOSE

"The purpose of the project was to develop a system for helping to solve small farmer problems. This was to have been accomplished through the identification, design, development of appropriate improved technology and other critical services. The system was to have been transferable among areas via component sub-systems."

The end of project status is given in terms of the "component sub-systems" referred to in the Purpose Statement. These sub-systems are described and discussed in "17" above.

In summary, the first sub-system component of describing the farmer progressed well up to a point, and is being transferred to other districts. The component of analyzing or understanding the farmer did not make progress due to lack of technical assistance and this has hampered efforts throughout the project.

The sub-system of on-farm adaptive research has also made some progress. Its real value is limited by the lack of analysis and understanding of the farmer and ICA's commodity (crop) orientation.

The sub-system dealing with group activity and delivery of services is difficult to distinguish in the field. Progress here is limited by the lack of analysis and understanding of the farmer, and ICA's lack of skill and appreciation of groups.

The sub-system of Monitoring and Evaluation has not emerged as a separate and visible entity. There has been evaluation, although ad hoc, and the project suffered from inadequacy here.

Sub-systems iii and iv should have been combined for simplification.

## 19. GOAL/SUB-GOAL

"The Goal of the Project was to identify and test methods which would have led to a net increase in small farmer income and welfare on a basis that could have become self-sustaining."

There has not been time enough to measure this project against goal indicators in a meaningful way. The project aims to improve technology available to the small farmer and it seeks this end through helping improve the technology (methodology) of the entity responsible for generating and difusing the improved small farm technology. Some technologies have been tested and in two districts about 10% of the ICA usuarios are using them. Early economic analysis indicates that net income increases are possible. See Section 13.

20. BENEFICIARIES

This project should have benefited the small farmer and his family. Its greatest impact should have been on increasing farm income, but it could have had an impact also on family nutrition and health.

More than 2,000 farm families are in direct contact with the project in three tests sites. They will be the first to benefit. But in the organization of the project they should be considered more as test cases than as beneficiaries. ICA is passing successful results from the pilot areas to the DRI areas (Integrated Development) and the 1980 target is 100,000 farmers.

There is no meaningrul way to anticipate the number of beneficiaries and the extent to which they could benefit. If ICA could succeed in developing a full interaction with the small farmer, the number of direct beneficiaries could number in the hundreds of thousands; incomes could double, and part of the income could be invested in education of the youth which in turn would bear dividends. The extra production would also result in increased farm employment in the rural areas and a more dependable and lower cost supply of food in urban areas. If the original design had been followed supported by adequate assistance, there was an excellent chance that the goal would have been achieved, although not within the project time frame. Now that USAID participation is ending, any statement on beneficiaries would be highly tentative.

21. UNPLANNED EFFECTS

There have been no unplanned effects detected.

22. LESSONS LEARNED

A. That the project design should be thoroughly understood and supported by the power structure within the implementing agency prior to signing the loan agreement. In this case, the reluctance of ICA to contract technical assistance and the lack of congruence between the implementation plan and the project design set forth in the project paper, stems directly from the extremely limited participation of ICA personnel in project preparation.

A special problem also emerged when USAID/C accepted an implementation plan to be managed within the overall ICA structure. Based on this plan which met a final C.P., the first disbursement was made. After losing this initial leverage USAID found itself working

with a level of project management that had no serious institutional support. Any similar project in the future should not be approved until adequate assurance of top level support is received. Again, as with other projects prepared during the same period within the Mission, project development was rushed in order to meet an AID/W deadline for obligation of funds.

B. That a project aimed at helping a national institution develop, improved methods of operation requires adequate technical assistance. This is not the first USAID/C experience that indicates that financial resources are not the most important limiting factor in development.

C. That when a Mission enters into a project with a design that in some ways is both subtle and sophisticated, although realistic, it must commit itself completely and provide itself with the technical competence to manage the project. If such competence cannot be provided in-house, it probably can be provided by TDY. In this case a few weeks per year of the designer's time could have improved significantly this project's chances of success.

(a) General Background

The activities of the Small Farmer Development loan are divided into sub-projects being carried out in three geographic areas:

- 1) South Huila
- 2) North Santander
- 3) South Guajira

Since the initiation of the Small Farmer Development Project, ICA has made considerable advances in changing their technology generation and transfer methodology to make it more amenable to solving the special problems of the small farmer with limited resources. Most of what was initiated were direct attempts to respond to the different components as expressed in the Project Paper.

During the 1979 evaluation Ken McDemott of AID/W/DS/AGR observed the following:

1) Project design was both comprehensive and specific on certain critical issues, although the project implementation plan did not treat some critical issues adequately. USAID managers were not specifically skilled in the technical areas covered by the project, and responsibilities were shared by four USAID officers in the first 14 months of the project.

2) No plans existed in the Project Paper for Technical Assistance in the critical area of viewing and examining the small farmer as a farm system rather than focusing upon a single crop. Plans for technical interchange were bogged down. A principal technique currently being used to know and understand farmers (ficha técnica) was costly and cumbersome, and the information it presented was often inaccurate in regard to the average small farmer.

3) Technical input to the project had been inadequate. Because of internal resistance to contracting technical assistance ICA relied upon its own devices in designing and testing new methodologies, which often conflicted with its own tradition. In view of this ICA had done a creditable job. There was some progress in collecting and utilizing objective data on geographic areas of a global or macro area, and this technology was being used by ICA outside the project areas. There was also notable progress in knowing something about the agriculture of ICA areas and identifying certain types of problems.

4) In the Project Paper, the goal and purpose embodied virtually the same concepts with different wording. There was no hierarchical relationship. Goal indicators were not realistic in a three-year project of such complexity.

5) The purpose statement was adequate, and the end of project status indicators were good. Five "sub-systems" were listed but they varied in importance, difficulty, and nature. Progress of some nature was being made in all five. There was no single sub-system evaluating and monitoring the project, although ad hoc evaluating and monitoring was being done. The Ficha Técnica was intended to serve a monitoring function, along with other functions, but was not made functional.

Some components of the system were being diffused throughout ICA, but the effect was not known.

6) The major problems were incongruence of project design and project implementation, lack of technical assistance and technical interchange in key areas, and weak GOC administrative support to ICA which made it difficult to provide inputs.

The conclusion was that prospects for fully achieving the Goal and Purpose of the project were limited if the current project trajectory continued although ICA should have been able to make significant if modest improvements in developing some improved techniques for the small farmer and have a better understanding of small farmer requirements.

(b) Search for Adequate Technical Assistance

The loan was authorized in December, 1975 but project start up really began in early 1977. The project paper stressed the importance of a strong technical assistance element to keep the project on track and innovative, but the T.A. element was not present during project start up.

Evaluation by the Mission, with the help of AID/W, in February, 1978 pointed up the consequences of inadequate technical assistance. The problem was exacerbated by ICA's reluctance to employ non-Colombian technicians, and an inability to get travel clearance from the Ministry of Agriculture to effect the planned interchange program with a series of countries and technicians who had proven capabilities. In effect, ICA was operating in isolation. Also needed was a way to involve the farmer more completely, and work with a "farm management" concept instead of the traditional "crop" or commodity emphasis.

Unfortunately, the above changes were highly dependent upon appropriate technical assistance which was slowly passing through the contracting process (two bid requests). At about the 28th month of a 36-month project, one expert arrived to provide T.A. in Marketing and Evaluation.

In May 1979, the Mission again evaluated the project with help from AID/W and verified the conclusion that if the project could not get some technical assistance soon in farm management, including record-keeping and farm management surveys, that the project's impact was going to be severely limited.

The findings of the evaluation were translated into requirements critical to any possible extension of the Loan TDD by USAID. ICA confirmed its agreement by formally requesting assistance in obtaining the appropriate technical expertise to effect the farm management emphasis.

Shortly after (August 1979) USAID arranged for Ken McDermott, AID/W/DS/AGR, and Dr. Peter Hildebrand, Rockefeller Foundation, to hold a meeting in Colombia with ICA project personnel and ICA management with the purpose of reprogramming key activities under the supervision of Hildebrand and other technical advisors. This resulted in an institutional commitment to change project emphasis to farm management through on-the-ground T.A. and a series of special in-country seminars to be arranged by USAID, AID/W, and Dr. Hildebrand.

A person ideally suited for the in-country T.A. was located, but his non-availability was confirmed in early October 1979. At the same time ICA made a formal request to Rockefeller for the full time services of Dr. Hildebrand, and USAID/C set the machinery in motion through cables to AID/W to extend the loan. Also, ICA formally asked USAID/C to arrange Technical Assistance and extend the Loan.

In November 1979 we learned that Hildebrand was going to the University of Florida but would be available for two weeks each quarter to backstop the Colombian Small Farmer Loan. He had contacted seven different specialists in order to arrange full-time in-country T.A. but, on December 1, it was confirmed that all seven were unavailable.

Shortly thereafter Hildebrand located an ideal candidate, Dr. Miguel Angel Altieri. Altieri travelled to Colombia and was approved by ICA in December 1979. In early February 1980 USAID/C received permission from AID/W to extend the loan to June 30, 1981 contingent upon appropriate technical assistance. Hildebrand, Altieri and the AID Regional Contracting Officer arrived in Colombia in February to complete the necessary contracts. Everything seemed in order but the contract totals exceeded the ICA General Managers' approval limit and therefore needed approval from ICA's Board of Directors.

On February 15 USAID/C was notified that the Board would not approve the contracts. The reason given was that they did not want to increase budget expenditures for 1980. USAID/C responded by suspending disbursements until a detailed review of the project could be made.

The review resulted in USAID/C disbursing local cost funds through December 31, 1979 and US dollar funds for an ongoing technical assistance contract with IICA-ICA until May 10, 1980.

(c) Current Status

The project paper envisioned the project passing through various stages in all three districts: (1) a desk analysis (complete), (2) a field analysis (complete) from which the ICA technicians designed (3) pruebas de ajuste (example Annex 2 ). In stage (3) the technicians took the best ICA technology and adjusted it to local conditions and tried to prove it was better than local technology. This included several crops, different treatments (fertilizer, seed, insecticides, spacing) and a number of replications. ICA controlled these pruebas although they were on small farms in the district. Some of the pruebas required 3 years and the first ones were complete in November 1979.

(Next (4) the information from the pruebas was used to develop planes de transferencia (example Annex 4 ) which are written plans (including a specific plan for communications) to transfer this proven technology to additional small farmers.

The final stage (5), which S. Huila is now entering, envisions Planes de Producción ( x ). This is a mechanism for increasing total area production and involves organization of credit inputs (fertilizer, herbicides pesticides, seed, etc.) and addressing the storage and marketing problems.

An important output of the project, as of this evaluation, are a series of methodologies which have been developed and are in use in areas outside the AID/ICA districts. They are as follows:

- (1) Methodology for Desk Analysis
- (2) Methodology for Field Analysis
- (3) Methodology for Ficha Técnica (modified, simplified form for follow-up: seguimiento)
- (4) Methodology for Pruebas de Ajuste
- (5) Methodology for Planes de Transferencia
- (6) Methodology for Planes de Producción
- (7) Methodology for Planes de Comunicación

And with Technical Assistance from IICA, methodologies in (8) marketing and (9) Evaluation have been developed.

Ken McDermott and Pete Hildebrand felt that these were "traditional and not necessarily innovative" and that modifications to simplify some of them (such as the Ficha Técnica) would make them more practical.

(d) Conclusion

Based on the above, prospects for achieving the project purpose are not good primarily because appropriate technical assistance was not available and USAID's participation in the project has now ended.

## 5. REVISION DE LITERATURA.

Los trabajos de investigación que se han llevado a cabo en este aspecto son muy pocos, aunque la asociación de cultivos es tradicional en casi todas las zonas yuqueras del país.

Estudios realizados en el CNIA - Palmira por Gartner y Varón en 1972, sobre algunas asociaciones de yuca con otros cultivos reportan rendimientos de 24.28 Ton/Há de yuca y 0.531 Ton/Há de frijol en forma asociada en un período de 12 meses, y para yuca sola rendimientos de 20.63 Ton/Há en el mismo período (1).

Con base en los resultados de una encuesta a nivel agricultor efectuada por el CIAT en 1975, se pudo concluir que el ingreso económico es mayor en los sistemas de cultivos mixtos que en los de monocultivos, y que, dentro de estos sistemas mixtos la asociación yuca-frijol produce los mayores ingresos (2)netos.

## 6. CRONOGRAMA DE ACTIVIDADES.

6.1. Localización. Municipios de Suaza y Oporapa, E.A.-  
Yambaró.

6.2. Fecha de iniciación: Semestre A 1978.

6.3. Duración probable : 3 semestres.

6.4. Materiales.

Se utilizarán las variedades de yuca y frijol preco

1. <sup>6</sup> TITULO. Determinación de las densidades de siembra mas adecuada para el Arreglo Yuca//Frijol.

2. PERSONAL. Planeado por. German Tovar M. I.A.  
Responsables: German Tovar M. I.A.  
José A. Cruz Q. I.A.  
Alberto Bárcenas I.A.

Colaboradores: Prácticos de los Municipios de Suaza y Coporapa.  
Dirección E.A. Yamboró.

### 3. JUSTIFICACION.

El cultivo de yuca intercalado con frijol es tradicional en un alto porcentaje de agricultores en la zona de influencia del Distrito. Se han comprobado las ventajas económicas del arreglo Y//F pero, se desconocen las densidades óptimas del mismo, por tanto es necesario determinarlas.

### 4. OBJETIVOS.

- 4.1. Confirmar, a nivel de agricultor, que al intercalar frijol en el cultivo de yuca, proporciona ingresos adicionales y, por ende, una mejor utilización del área disponible.
- 4.2. Determinar las distancias de siembra de yuca intercalando diferentes poblaciones de frijol para obtener la combinación más adecuada del arreglo Y//F.

minantes en cada Municipio.

6.5. Métodos.

6.5.1. Distancias de siembra.

Cultivo	Entre surco (mts)	Entre planta	Densidad (Planta/Há)
Yuca	1.20	1.20	6.944
	1.20	1.00	8.333
	1.20	0.80	10.416
Frijol	0.40	0.50	46.000
	0.40	0.25	192.000

6.5.2. Area de parcelas : 36 mts<sup>2</sup>. (3.60 x 10 mts).

6.5.3. Número de surcos por parcela: 4 surcos de 10 mts. para yuca; 9 surcos de frijol intercalando 3 entre 2 surcos de yuca.

6.5.4. Tratamientos (poblaciones a evaluar).

Tratamientos	YUCA	FRIJOL	Población	
	Entre surcos - entre plantas mts.	Entre surcos - entre plantas mts.	Yuca (planta / Há)	Frijol
1	1.20 x 1.20	0.40 x 0.50	6944	96000
2	1.20 x 1.20	0.40 x 0.25	6944	192000
3	1.20 x 1.00	0.40 x 0.50	8333	96000
4	1.20 x 1.00	0.40 x 0.25	8333	192000
5	1.20 x 0.80	0.40 x 0.50	10416	96000
6	1.20 x 0.80	0.40 x 0.25	10416	192000
7 +				
8 ++				

NOTA: Se sembrarán 4 semilleros de frijol por sitio para valsear a los 10 días dejando 2 plantas/sitio. En cada localidad se sembrarán, tanto la yuca como el frijol, en las mismas épocas y diferencias de tiempo acostumbradas por el agricultor.

+ Se sembrarán un testigo con las distancias y número promedio de semillas de yuca y frijol utilizadas por el agricultor.

++ Se sembrará otro testigo similar al descrito en el asterístico anterior pero sin intercalar frijol.

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6.5.5. Diseño experimental. Bloques al azar, con 4 replicas-  
ciones.

6.5.6. Distancia entre bloques : 3 mts.

6.5.7. Area total del ensayo. 1750 mts<sup>2</sup>.

6.5.8. Cantidad de semilla de yuca para cada ensayo: 1400, -  
estacas.

6.5.9. Número de ensayos: 3

#### Labores culturales.

1) Preparación del suelo.

2) Tratamiento de la semilla de yuca con Dithane M-45 mas Man-  
zate (2.22 + 1.25 gramos/ litro de agua) respectivamente,  
previamente mezclados.

3) Número de estacas por sitio: 1

4) Posición de la estaca : Forma acostumbrada por el agricul-  
tor.

5) Control de malezas. Las que sean necesarias. Aporque cuan-  
do las matas tengan 1 mt. de altura.

6) Control de plagas.

a. Gusano cachón: Dipterex 80 = 400 grs/Há.

b. Acaros, Trips, Mosca blanca, mosca del cogollo con sis-  
témicos.

#### Datos a tomar:

1. En el suelo. Análisis químico completo en cada bloque.

2. Clímático . En lo posible precipitación diaria.

3. Para cada parcela, de yuca:

- a. Peso de raíces por planta.
- b. Ataque de plagas y enfermedades (control, producto, dosis y fecha).
- c. Número de plantas cosechadas por parcela.
- d. Fecha de siembra.
- e. Fecha de cosecha.
- f. Costos de producción.
- g. Variedad utilizada.

4. Para cada parcela, de frijol:

- a. Fecha de siembra.
- b. Variedad utilizada.
- c. Número de plantas cosechada por parcela, (todos los surcos).
- d. Promedio de vainas por planta y por parcela (20 plantas al azar).
- e. Ataque de plagas y enfermedades (control, producto, dosis, época).
- f. Fecha de floración.
- g. Fecha de maduración. y cosecha.
- h. Costos de producción.

7. PRESUPUESTO. (Ver Anexo No. 0)

## BIBLIOGRAFIA

1. Informe Anual Programa Tuberosas. ICA, Seccional Palmira. 1972.
2. Centro Internacional de Agricultura Tropical. CIAT -Sistemas de Producción de yuca. Cali 1975.

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PRESUPUESTO.

	78A \$	78B \$	79A \$
+ I . Gastos Personales.	12751.	13897.	13897.
++II Gastos Generales.	4960.	5456.	5456.
+++Materiales e insumos	4000.	3000.	3000.
++++ III Gastos de trans ferencia.	2337.	2524.	2524.
TOTAL. . . . .	\$ 24088.	24877.	24877.

+ Incluye los sueldos, primas y vacaciones de 2 Ingenieros Agr6-  
nomos y 12 Ayudantes de Técnico, con 50% de dedicación a Inves-  
tigación. Además jornales para atender los lotes de ensayo.

++ Incluye gastos de vehículos, viáticos, gastos de viaje, servi-  
cio de comunicaciones, impresos y publicaciones, arrendamiento  
de lotes y alquiler de vehículos.

+++ Incluye costo de semillas, herramientas, insecticidas, etc.

++++ Incluye Fondo Nacional del Ahorro, Caja Nat de Previsión, Cor-  
veica, Auditaje, SENA y ECBF.

TECHNOLOGY PACKAGES

Some of the more visible results came in the form of improved technology recommendations. Some basic economic analysis was also done and is included here with examples of the new extension leaflets provided in Annex 5. The economic analysis reveals substantial financial returns to those farmers who have utilized the technology recommended by ICA.

AGRICULTURE TECHNOLOGY - Net Income  
(\$ COL)

<u>District</u>	<u>Crop</u>	<u>Traditional</u>	<u>New</u>
<u>S. Huila</u>	Sugar Cane	\$ 22,728/ha/yr	\$113,184/ha/yr
	Beans & Corn	10,950/ha/crop*	26,764/ha/crop
	Yuca	2,520/ha/crop	9,774/ha/crop
<u>S.Guajira</u>	Yuca	\$12,330/ha/crop	\$27,240/ha/crop
	Rice	10,394/ha/crop	17,823/ha/crop
	Beans	4,107/ha/crop	11,694/ha/crop
	Tomato	20,594/ha/crop	52,080/ha/crop
<u>N.Santander</u>	Yuca	\$ 7,600/ha/crop	\$29,800/ha/crop

\* At least 2 crops of beans and 1 of corn per year.

Note: Average amount of land cultivated for sugar cane, yuca and beans/corn is about 1 ha/farmer.

This makes the above chart more useful because in general one can equate the numbers of hectares to the number of farmers. (For example: In S. Huila there are 4,952 small farmers who depend on yuca for their main source of income. This represents 4457 has. or .9 ha./farmer. About 10% are using the new technology now. If all of them were to accept it, the improvement of traditional vs. new would be from \$2520/ha/yr x 4457 Ha = \$11,231,640 to \$9774 ha/yr x 4457 ha = \$43,562,718). Similar comparisons for the other crops are even greater and support the project rationale that small farmers can increase production substantially when given the proper tools.

PLAN DE TRANSFERENCIA DE TECNOLOGIA SOBRE CONTROL DE PLAGAS Y  
ENFERMEDADES DEL FRIJOL EN EL SECTOR II, DEL DISTRI  
TO SUR HUILA (1)

1. INTRODUCCION

El Distrito dedicó 5.132 Hás para el cultivo de Frijol, durante los, semestres 1.978-B y 1.979-A, cifra que representó un 31.3% del área que este tiene en "cultivos semestrales", (2)

La producción alcanzó un monto de 3.770.4 Ton, para un valor de \$101.203.574.00, distribuidos en dos sistemas, mecanizado y tradicional; el uno como el otro con disposición del arreglo sólo y múltiple (2).

Para éste año agrícola, el Sector Tradicional representó el 80.56% del área sembrada; de este el 65.84% correspondió el arreglo múltiple.

De acuerdo al análisis de la información de Ficha Técnica (Diagnóstico Agrícola 1.978-B) los Municipios de Suaza y Guadalupe, Areas de Trabajo del Sector II, reportaron 20 agricultores con 42.0 Hás dedicadas al cultivo de Frijol en arreglo con Maíz; cultivos en los cuáles no se hizo control alguno de plagas y enfermedades; con un promedio de producción por hectárea de 650 kl.

Según el CIAT, mediante prácticas agronómicas se logra un incremento de cerca del 50% en los rendimientos; prácticas que con-

sisten, básicamente en fumigaciones curativas contra Empoasca y Antracnosis, como desyerbas previas a la floración (4,5,6 y 7).

## 2. OBJETIVOS

2.1. General: Introducir prácticas de control de plagas y enfermedades en el cultivo de Frijol, tanto en su arreglo sólo F(o) como múltiple (M//Fa), a nivel de Pequeño Agricultor; con el fin de mejorar sus rendimientos.

### 2.2. Específicos:

- .1. Motivar a los agricultores de Frijol en la necesidad de controlar las plagas y enfermedades más frecuentes en el área
- .2. Capacitar a los agricultores en la identificación y control de plagas y enfermedades del frijol en el área.
- .3. Orientar a los agricultores de Frijol, por medio de la Asistencia Técnica, en el reconocimiento adecuado, control de plagas y enfermedades.

## 3. METAS

- 3.1. Lograr que por lo menos un 80% de los Agricultores conozcan y adopten prácticas de control de plagas y enfermedades.
- 3.2. Elevar por lo menos a 1.000 Kg/Há. la producción de Frijol, en un 25% de los agricultores.

## 4. METODOLOGIA

## 4.1. Mensajes

T e m a	Práctica Recomendada
1. Desyerba oportuna	<p>1.1. Mantenga su cultivo limpio de malezas, utilizando pala o azadón entre los surcos y a mano dentro de ellos. Haga la primera desyerba dentro de los 25 días, después de la germinación y la segunda, poco antes de la <u>flo</u>ración.</p> <p>1.2. Mantenga limpios los bordes del cultivo</p>
2. Determinación de la <u>presen</u> cia y daños de insectos y enfermedades.	<p>2.1. Inspeccione su cultivo por lo menos una vez por semana, cruzándolo en forma de zic-zac; observando en ambas caras de las hojas, la presencia de daños por insectos o por enfermedades.</p> <p>2.2. Identifique, en lo posible, el insecto o la enfermedad o tome las <u>muestras</u> necesarias.</p> <p>2.3. Avise al Técnico del ICA más cercano.</p>
3. Control plagas y <u>enferme</u> dades.	<p>3. 1. Controle plagas</p> <p>.1. Saltahojas, chicharrita, lorito verdé: Empoasca kraemerí. Hacer de acuerdo a las circunstancias dos aplicaciones de los siguientes insecticidas, dirigidos hacia el follaje: - Roxión o Perfección o Diostop en dosis de 0.5 a 1.0 lt./Há (2-8 cucharadas soperas por bomba de 20 litros). © Sevín 80 u 85 en dosis de 1.0 a 1.5 Kg/Há. (10-15 cucharadas soperas por bomba de 20 lts.)</p> <p>.2. Cucarroncitos de la hoja: Diabrotica spp - Cerotoma spp - Epitrix sp. - Sevín 80 u 85 en dosis de 1.0- a 1.5 kg/Há (10-15 cucharadas soperas por bomba de 20 lts.) - Basudín en dosis de 0.5 a 1.0 lt/Há (7-8 cucharadas soperas por bomba de 20 lts.)</p> <p>.3. Otros, según recomendaciones del <u>Ingenie</u>ro Agrónomo.</p> <p>3.2. Controle enfermedades:</p> <p>.1. Antracnosis: <u>Coletrotichum lindemuthianum</u></p>

T e m a	Práctica Recomendada
3. Control plagas y enfermedades.	<p>.2. Mancha angular: <u>Isariopsis griseola</u> - Beñlate en dosis de 30 grs. por bomba de 20 lts. aplicaciones curativas al follaje.</p> <p>.3. Otras, según recomendaciones del Inge<sup>n</sup>iero Agrónomo.</p>

#### 4.2. ESTRATEGIAS

No. Orden	Métodos y Ayudas (Medios)	Descripción
1.	Visitas de reconocimien <u>to</u>	<p>Se hará una visita de reconocimiento a <u>ca</u>da Frente, con el fin de determinar por finca, las condiciones para selección de usuarios:</p> <p>1.1. Area dedicada al cultivo de Frijol y sistema de siembra.</p> <p>1.2. Distribución de las fincas para conformación de Grupos de Capacitación.</p> <p>1.3. Identificación de otros cultivadores de Frijol, no usuarios.</p> <p>1.4. Listado de cultivadores de Frijol, <u>dis</u>criminados por usuarios y no usuarios, según Forma anexa.</p> <p>NOTA: Grupo de Capacitación, agricultores con fincas relativamente cercanas entre sí, integrados para casos específicos, bajo la orientación de un Práctico.</p>
2.	Visitas de Información	<p>Visita a cada Finca de Usuarios, para información sobre el Plan; invitar al curso sobre Plagas y Enfermedades del Frijol, <u>in</u>dicando sitio, fecha, hora y objetivos. <u>Es</u>ta visita será reforzada y ampliada en su cubrimiento, mediante lá elaboración y <u>en</u>trega de una carta Circular, por medio de la cuál se invita a Usuarios y no Usuarios al curso sobre Plagas y Enfermedades del Frijol; indicando sitio, fecha y hora. <u>Es</u></p>

No. Orden	Métodos y Ayudas (medios)	Descripción
2.	Visitas de información	ta Carta Circular se distribuirá por medio de las Escuelas.
3.	Cursos	<p>Sobre identificación de daños de insectos y enfermedades más frecuentes en los cultivos de Frijol del área, condiciones para su desarrollo, técnicas de muestreo del cultivo, manejo de pesticidas y equipos. Se utilizarán las siguientes Ayudas y Medios:</p> <p>3.1. Sonoviso sobre Plagas y Enfermedades en Frijol.</p> <p>3.2. Papelógrafo sobre Control de Plagas y Enfermedades, manejo de pesticidas y equipos.</p> <p>3.3. Mimeografiado sobre la materia</p> <p>3.4. Demostraciones de Método sobre técnicas de muestreo de cultivos para detectar presencia e incidencia de plagas y enfermedades, manejo y cuidado de pesticidas y equipos, aplicación de pesticidas.</p>
4.	Visitas a la Finca	<p>Por lo menos una visita quincenal de inspección por parte del Práctico y por lo menos una mensual de asistencia técnica por parte del I.A. a cada finca de usuario. Cada visita debe producir una constancia en forma específica (Records); donde, además de los datos regulares, debe consignarse en forma clara la situación encontrada y las recomendaciones a que hubiere lugar.</p> <p>NOTA: Las visitas a no Usuarios se harán por solicitud expresa de éstos, bajo las mismas condiciones de elaboración del Record.</p>
5.	Giras	<p>Cada Grupo de capacitación hará una Gira de reconocimiento a los cultivos de los Usuarios con Asistencia Técnica, dentro del Plan; con el fin de constatar, por medio del intercambio de experiencias, los resultados de las prácticas utilizadas y las circunstancias específicas que las determinaron. Esta gira se hará entre los 30 a 100 días de establecimiento de los cultivos.</p>

No. Orden	Métodos y Ayudas (medios)	Descripción
6.	Días de Campo	Se hará un Día de Campo en las parcelas de Alto Rendimiento, instalada en la Finca El Tesoro, Vda. Los Cauchos de Guadalupe, propietario Rodolfo Pimentel. El usuario en donde se instaló, debe ser el responsable de la presentación de su desarrollo y resultados, el Sector presentará un Resumén por medio de Papelógrafo, entregando mimeografiado sobre las Prácticas realizadas.

## 5. RESPONSABLES

### 5.1. Autores

- .1. José Augusto Cruz Q., Ingeniero Agrónomo S-I (E)
- .2. Enrique Van Arcken, I.A. Coordinador Componente Agrícola (E)

### 5.2. Ejecutores

- .1. Alirio García M., Ingeniero Agrónomo S-II
- .2. Hernando Hoyos, P.A. Area de Trabajo Guadalupe
- .3. Diógenes Bustos, P.A. Area de Trabajo Guadalupe
- .4. Luis Segundo Roza W., P.A. Area de Trabajo Suaza

### 5.3. Coordinadores

- .1. José Augusto Cruz Q., Director Distrito. Implementación operativa; coordinación apoyos específicos intra e inter institucional.
- .2. Alberto Bárcenas C., I.A. Coordinador Componente Agrícola; apoyo técnico; coordinación interdistrital.

### 5.4. Evaluadores

- .1. José Téllez, Asistente de Investigación, División de Comunicaciones
- .2. Daniel Gutiérrez, I.A. Director Regional No.6 de Investigación
- .3. Luis Eduardo Chaves, I.A. Director Regional No.6 de Desarrollo Rural

#### 6. LOCALIZACION Y AUDIENCIA

El Plan se ejecutará en el Sector II, Distrito de Transferencia de Tecnología No.4, Sur Huila

Municipio	Vereda	Finca	Usuarios	Area en Frijol Há
Guadalupe	San Pedro	La Paja	Isaias Guillermo	0.2
		El Higuerón	Isidro Valderrama	0.1
		La Paja	Gerardo Ramirez	0.15
	S. Antonio	El Plan	Aristides Quiróz	4.0
		El Calpón	Jorge E. Ospina	0.2
		El Cementerio	Angel Páramo	0.5
	Los Cauchos	El Guabito	Ribeante Rojas	1.25
		El Tesoro	Rodolfo Pimentel	0.25
		Llano Bonito	Abraham Acevedo	0.25
		La Soledad	José A. Acosta	1.0
Suaza	Quemadas Avispero	La Estrella	Carlos Artunduaga,	0.25
		Los Angeles	Lorenzo Ramirez	0.5
		La Primavera	Gabriel Gaitán	0.75
		San Rafael	Ernesto Ramirez	0.5
		Las Vegas	Alfonso Cuellar	0.75
	Gallardo	La Portada	Rofelio Cuellar	1.0
		La Esperanza	Marcelo Silva	0.75

NOTA: Listado sobre F.T., en proceso de constatación mediante Visitas de Reconocimiento.

7. CRONOGRAMA

No. Orden	Método o Actividad por Ayudas (medios)	Canti- dad.	Respon- sables *	C R O N O G R A M A									
				Preparación			Entrega						
				De Fec. Mes	Hasta Fec. Mes	Cant.	De Fec. Mes	Hasta Fec. Mes	Cant.	De Fec. Mes	Hasta Fec. Mes	Cant.	
1.	Visitas de Reconocimiento	3	(1)	1	X	5	X		8	X	11	X	
2.	Vsita de Información	15	(2)	8	X	11	X		15	X	18	X	
	2.1. Carta Circular	25	(3)	15	X	18	X	25	22	X	24	X	25
3.	Curso	1	(4)	17	X	24	X	1	26	X			1
	3.1. Sonoviso	2	(5)	8	X	18	X	2	26	X			1
	3.2. Papelógrafo	1	(6)	8	X	18	X	1	26	X			1
	3.3. Hojas Mimeografiados	50	(6)	8	X	18	X	50	26	X			50
	3.4. Demostraciones de Método	3	(7)	8	X	18	X	3	26	X			3
	.1. Técnica de muestreo en cul- tivos												
	.2. Evaluación de daños												
	.3. Manejo de pesticidas y equi- po de aplicación.												
4.	Visitas a Fincas	135	(8)	22	X	26	X	1	29	X	31	I	135
	4.1. Libretas de recomendacio- nes (Record)	4	(8)	22	X	26	X	4	29	X	31	I	4
5.	Giras	3	(8)	10	XII	14	XII	3	17	XII	21	XII	3
6.	Días de Campo	1	(8)	1	I	4	I	1	9	I			1
	6.1. Papelógrafo resumen	1	(6)	1	I	4	I	1	9	I			1
	6.2. Hojas Mimeografiadas	50	(6)	1	I	4	I	50	9	I			50

- \* (1) P.A. Hernando Hoyos, Guadalupe, Diógenes Bustos, Guadalupe, Luis Rozo, Suaza.  
 (2) I.A. Alirio García, Resp. S-II.  
 (3) P.A. Jorge E. Puentes-Garzón (4) I.A. Alberto Bárcenas, Comp. Agrícola  
 (6) I.A. Alberto Bárcenas, Alirio García; P.A. Jorge E. Puentes  
 (5) I.A. José Augusto Cruz, Director  
 (7) I.A. Alberto Bárcenas, Alirio García; P.A. Hernando Hoyos, Diógenes Bustos, Luis Rozo  
 (8) I.A. Alirio García; P.A. Hernando Hoyos, Diógenes Bustos, Luis Rozo.

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## 8. DURACION

El Plan tendrá una duración de cuatro meses, contados a partir de Octubre 1o. de 1979 hasta Enero 31 de 1.980.

## 9. COSTOS

Descripción del Costo	Unidad medida	Cantidad.	Valor Unidad. \$	Valor Total \$
1. Viáticos Ingenieros Agrónomos y 3 Prácticos	No.	31	400 X	12.400.00
2. Mimeografiados (cuadros inscripción, circular, hojas mimeografiadas.)	Hojas	150		400.00
3. Sonovisos (Plagas y enfermedades)	No.	2	2.000	4.000.00
4. Papel periódico	Hojas	50	4.00	200.00
5. Insumos demostrac.				
6. Transporte curso, giras, Día de Campo	Viajes	14	150.	2.100.00
7. Almuerzos curso	No.	25	100.	2.500.00
8. Refrigerios Giras y Día de Campo	No.	50	50.	<u>2.500.00</u>
			TOTAL	\$24.100.00

REVISION:

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Luis Eduardo Chaves  
Director Regional No.6 De-  
sarrollo Rural

APROBACION

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Hernán Rincón  
Director División Comunica-  
ción Rural

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José Téllez  
Asistente de Investigación  
Div. Comunicación Rural.

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## BIBLIOGRAFIA

1. CRUZ, José Augusto, 1979. Guía para la elaboración de Proyectos de Transferencia de Tecnología, Distrito Sur Huila.
2. VILLARRUEL, Libardo. 1979. Evaluación del cultivo de Frijol Año Agrícola 1979. Distrito Sur Huila
3. \_\_\_\_\_. 1979. Diagnóstico Agrícola con información de Ficha Técnica. Distrito Sur del Huila
4. \_\_\_\_\_. CIAT. 1978. Evaluación Agroeconómica de los resultados de las pruebas a nivel de finca, en el Sur del Huila.
5. \_\_\_\_\_. CIAT- 1976. Manual interno de Enfermedades del Frijol (*Phaseolus vulgaris* L.) y Recomendaciones para su control
6. \_\_\_\_\_. CIAT- 1978. Problemas de campo en los cultivos de Frijol en América Latina.
7. \_\_\_\_\_. CIAT- 1973. Potentials of field beans and other food legumes in Latin America.

*Anexo al 17017*

LISTA DE AGRICULTORES PARTICIPANTES EN EL PLAN DE  
TRANSFERENCIA DE TECNOLOGIA F(3)

Municipio: Guadalupe

		<u>Area</u>
1.	Isafas Guillermo                      Vda. San Pedro	2000 M <sup>2</sup>
2.	Isidoro Valderrama                    "            "	1000 M <sup>2</sup>
3.	Juan Isidro Guzmán                    "            "	500 M <sup>2</sup>
4.	Aristides Quiroz                        San Antonio	4 Hás
5.	Jorge Enrique Ospina                   "            "	2000 M <sup>2</sup>
6.	Angel Páramo                            "            "	0.5 Hás
7.	Rodolfo Pimentel                       Los Cauchos	1/4 Hás
8.	José Antonio Acosta                   "            "	1 Há

Municipio : Suaza

1.	Lorenzo Ramírez                        Avispero	2000 M <sup>2</sup>
2.	Gabriel Gaitán                            "            "	0.5 Há
3.	Ernesto Ramírez                         "            "	3000 M <sup>2</sup>
4.	Alfonso Cuéllar                          "            "	1 Há
5.	Marcelo Silva                             Gallardo	0.5 Há
6.	Aldemar Esquivel                        "            "	0.5 Há
7.	Silvio Hermida                           San Calixto	3.0 Hás
8.	Benajmín Avila                           Quemadas	3.0 Hás
9.	Emeterio González                      Guayabal	0.5 Hás

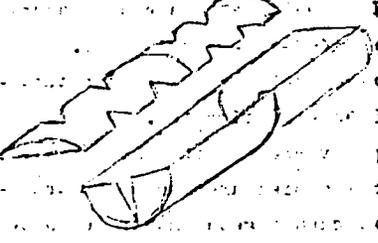
**PLAGAS Y ENFERMEDADES:**



En la zona las principales plagas que atacan los cultivos de caña son:

- Barrenador (*Diatraea saccharalis*)
- Cacorrón Cernado (*Podischnas agenor*)
- Picudo (*Metamasius hemipterus*)

**CONTROL:** Las dos últimas pueden controlarse - utilizando trampas de guadúa. Colocar 50 trampas por hectárea (1 por cada 200 metros cuadrados).



Estas se colocan en el suelo dentro del cultivo. En ellas se colocan - pulpa de caña. Los insectos encontrados dentro de las trampas cuando se revisen deben exterminarse.

Cuando se observe dentro del cultivo alta incidencia (mucho ataque) del barrenador puede controlarse con liberaciones de trichograma (20 - pulgadas por hectárea) "control biológico".

**ENFERMEDADES:** En la zona se presentan varias enfermedades que afectan el cultivo principalmente: Raquitismo; Mal de Ojo; Raya Clo... Lo más conveniente es utilizar semilla sana y bien desinfectada para evitarlas. Igual-

mente variedades resistentes.

**VARIETADES:**

De acuerdo con la experiencia y la adaptación en la zona pueden recomendarse como buenas productoras de Panela las siguientes:

- POJ 2878 - (REINA)
- POJ 2714 - (PIEL ROJAS)

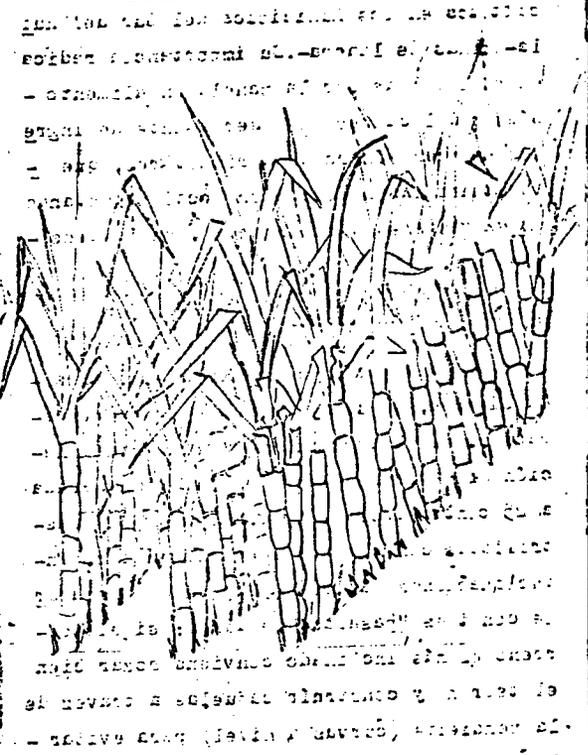
Evite sembrar dentro del mismo lote diferentes variedades.

**CORTE O COSECHA:** El tiempo de maduración tiene

relación con la altura sobre el nivel del mar donde esté ubicado el cultivo. El mejor método de cosecha es el "Corte por parejo" que consiste en cortar toda la caña a raz de suelo. Debe cortarse únicamente la cantidad de caña que pueda procesarse dentro de las 24 horas siguientes.

**BENEFICIO:** La calidad de la panela depende en gran parte de un adecuado procesamiento, por lo tanto es recomendable que esta labor sea ejecutada por mano de obra conocedora del oficio y con buena experiencia.

**EL CULTIVO DE LA CAÑA PANELERA**



I.C.A. RSG. No 5

**DISTRITO DE TRANSFERENCIA DE TECNOLOGIA SUR HUILA**

- I.A. JOSE VICENTE MUÑOZ P.
- I.A. ENRIQUE VAN-ARCKEN B.

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## EL CULTIVO DE LA CAÑA PANELERA

La Caña Panelera es uno de los principales cultivos en los Municipios del Sur del Huila - zonas de ladera. Su importancia radica en el hecho de ser la panela un alimento básico del campesino y ser fuente de ingresos de gran número de agricultores, que abastecen las necesidades locales quedando un excedente para el comercio, en lugares - siledaños.

### PREPARACION DEL SUELO

En la mayoría de los cultivos, para siembra, es importante una buena preparación. Si el terreno lo permite (inclinación del terreno menos del 30%), una arada de 25 centímetros de profundidad y dos rasmilladas con tractor son suficientes. En inclinaciones mayores (50%) puede prepararse con tres "pasadas" de Yunta; si el terreno es más inclinado conviene rozar bien el terreno y construir cajuelas a través de la pendiente (curvas a nivel) para evitar la erosión.

### SURCADA

Preparado el terreno se procede a surcar o construir cajuelas donde se depositará la semilla. Es recomendable que éstas cajuelas tengan una profundidad de 20 centímetros y estén separadas de 1,4 metros a 1,8 metros entre sí, según sea menor o mayor la inclinación.

**SEMILLAS:** Se obtienen de semilleros sanos y jóvenes cortando cañas 3 meses antes de la época normal de corte para beneficio. Las cañas se cortan perpendicularmente en trozos de 40 a 50 centímetros de largo con 3 o 4 yemas bien formadas.

### DESINFECCION:

Una vez cortada la semilla se procede a sumergir las puntas en una caneca con una solución de Benlate 5 gramos por 10 litros de agua y Ditharax por 80 SP 50 - 50 gramos por 10 litros de agua. "10 a 15 segundos son suficientes".

**FERTILIZACION:** Procédase a tomar una muestra representativa del suelo del lote y envíala al laboratorio de suelos para su análisis. El técnico en base al resultado podrá recomendarle la cantidad y la clase de fertilizante más conveniente.

En la zona se han obtenido altos rendimientos utilizando 300 kilogramos de compuesto 10-30-10 por hectárea, aplicados en el fondo de los sur-

cos, y Urea en "banda", 75 kilogramos a los 15 días y 75 kilogramos a los 120 días después de la siembra.

### SIEMBRA:

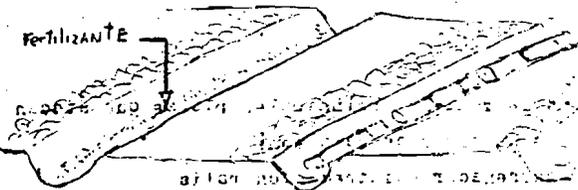
Aplicado el fertilizante se procede a cubrirlo con una fina capa de suelo y se deposita la semilla una tras otra en chorro continuo (chorro llo) a lo largo de la cajuela, luego debe cubrirse con suficiente tierra, lo ideal es dejar de 8 a 10 yemas por metro.

**CLIMA Y SUELOS:** La caña para Panela se adapta bien entre los 800 y 1.800 metros sobre el nivel del mar con temperaturas entre 18 y 24 grados centígrados.

Aunque puede cultivarse en diferentes suelos, los mejores son los bien drenados poco arcillosos y con una capa vegetal mayor de 20 centímetros.

**LABORES CULTURALES:** Además de una buena preparación, se obtienen altos rendimientos controlando las malezas oportunamente. Se recomienda tres desyerbas a los 3-6-9 meses después de la siembra. También pueden utilizarse matamalezas pero siempre bajo la recomendación de un Ingeniero Agrónomo.

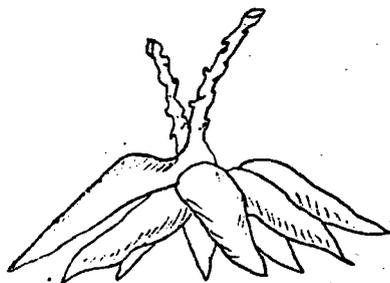
El cultivo de la caña panelera es una actividad que requiere de un manejo cuidadoso y constante para obtener los mejores resultados.





EL CULTIVO  
DE LA YUCA

Albergo Barcenas C  
Alirio García M.



La yuca se produce básicamente como cultivo de Pan Coger. Su valor se debe principalmente a su tolerancia a la sequía, a su capacidad para crecer en suelos pobres y a su resistencia relativa a las malezas y los insectos. Estas características unidas al hecho de poderse dejar en la tierra sin cosechar durante un período largo de tiempo, hacen de la yuca un cultivo de gran utilidad en épocas de escasez de alimentos. Además se puede sembrar y cosechar en cualquier época del año. Estas razones hacen de la Yuca un cultivo atractivo para el pequeño agricultor que no cuenta con facilidades para el riego.

CLIMA Y SUELOS

Este cultivo crece bien en zonas comprendidas desde el nivel del mar hasta los dos mil metros de altura. Resiste temperaturas bastante altas, pero a temperaturas bajas reduce su crecimiento y los rendimientos disminuyen rápidamente.

\* Ingenieros Agrónomos del Distrito de Transferecia de Tecnología Sur del Huila.

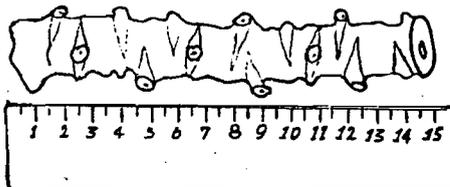
La Yuca prefiere para su buen desarrollo los livianos aunque se dá en diferentes tipos de ellos. No es exigente en fertilidad. No es conveniente sembrar en suelos húmedos debido a su poca resistencia a la humedad.

PREPARACION DEL SUELO.

Donde esta labor se realiza en forma manual se recomienda rosar, quemar y picar los sitios de la siembra para asegurar una buena germinación. En suelos mecanizables se hará una arada y de dos a tres rastrilladas, según el suelo, para darle una buena cama a la semilla.

SEMILLA

Una buena producción de yuca está influenciada principalmente por la calidad de la semilla: madurez apropiada, grosor, número de nudos por estaca y tamaño. La semilla debe tomarse de plantas que tengan de seis a dieciocho meses de edad, las estacas deben tener de cinco a ocho nudos y una longitud de 15 a 25 centímetros.



Deseche aquellos cangres o estacas con picaduras de insectos, chancros y que presenten coloraciones distintas a lo normal cuando se realiza el respectivo corte. El material cortado para una hectárea se debe tratar con un fungicida antes de proceder a sembrarlo para prevenir ataques de hongos del suelo que puedan dañar la germinación.

Se recomienda Dithane M-45, tres cuartos de libra disueltos en una caneca de cincuenta y cinco galones, llenando con agua hasta tres cuartas partes de ésta y sumergiendo las estacas medidas en un costal durante cinco minutos en esta solución.



SIEMBRA

Realicela antes de la iniciación del período de lluvias. Coloque la estaca en forma inclinada y deje una tercera parte por fuera de la superficie del suelo. Para variedades ramificadas siembre a dos metros entre surcos y un metro entre plantas colocando una semilla por sitio (5.000 estacas).

Para variedades no ramificadas siembre a 1.00 por 1.00 metro (10.000 estacas).

FERTILIZACION

En general se recomienda analizar el suelo para determinar las cantidades de fertilizantes más apropiados.

LABORES DE CULTIVO

Para lograr una buena cosecha se deben controlar las malezas oportunamente. El cultivo debe permanecer limpio especialmente en los primeros seis meses de su desarrollo, de allí en adelante le sombrar de la misma planta contra las malezas. Es necesario un aporque entre el mes y medio y dos