



CIMMYT's Regional Maize Program for Central America and the Caribbean



Diego Rivera, Mural, Presidential Palace, México DF

Presentation to External Program and Management Review

Jorge Bolaños
CIMMYT Regional Maize Agronomist
Guatemala, November 10, 1997



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1. Maize in Central America

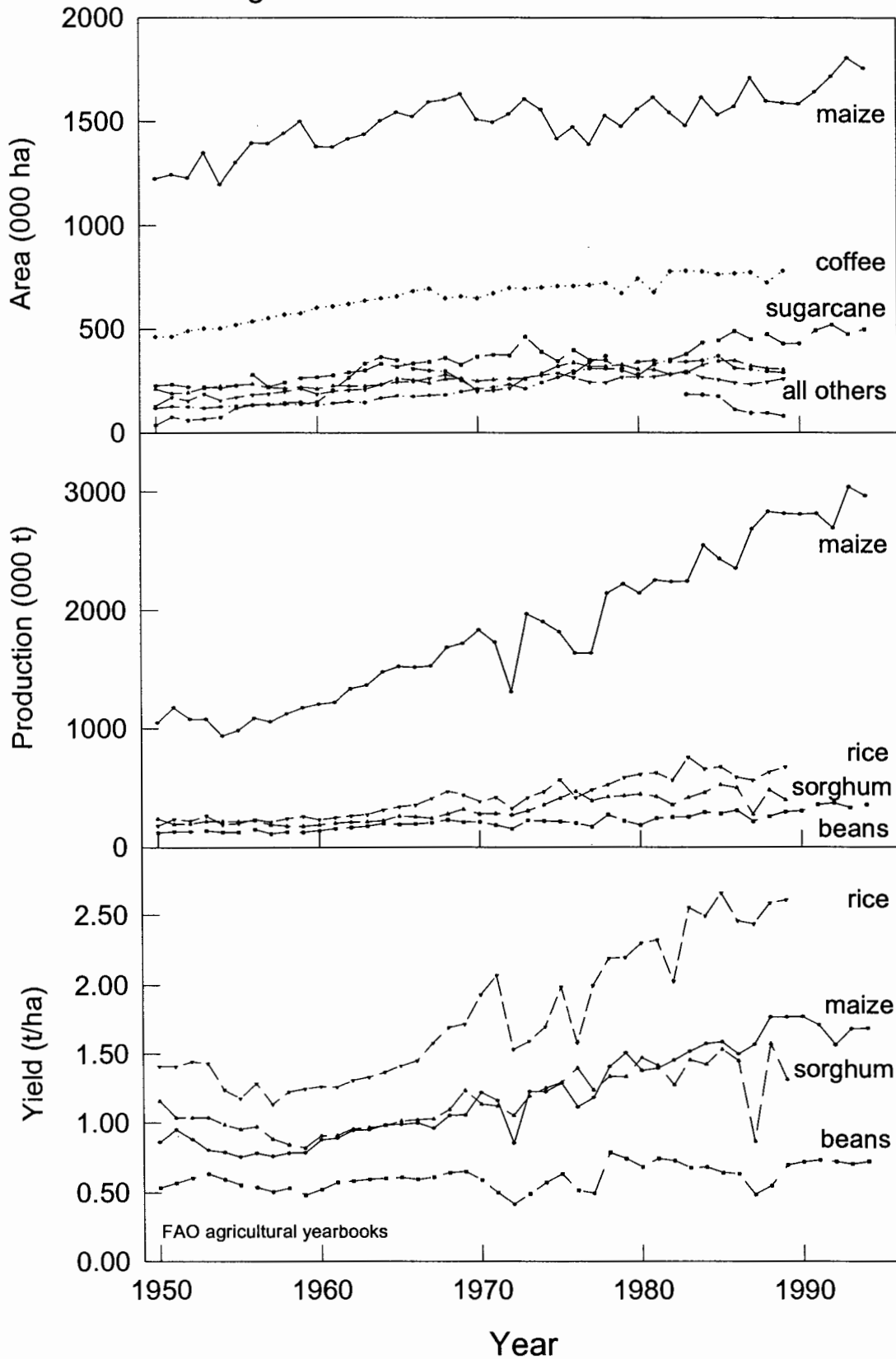
- CA&C is the center of origin of maize/beans with highly developed pre-Columbian slash and burn *milpa* cropping systems
- The Spanish conquest causes a huge population hecatomb, and the region only recovers the pre-Columbian population levels until the mid-1900's
- *Popol Vuh and Hombres de Maíz*—maize is food, folklore, culture, tradition
- Maize is the most important subsistence crop for resource-poor rural families planted mostly with traditional low-input technologies, that can lead to degradation of the resource-base
- 2 million hectares are planted annually with a mean grain yield of 1.6 t/ha
- Population of 30 million growing around 3% annually, with the increase concentrating mostly in urban centers, not the rural areas—with increased demand for food
- The triangle between poverty, population growth, and agriculture/environmental degradation is difficult to break—current land use patterns are *alarming*
- CG considers that 80% of the world's *unsustainable* agriculture is this kind of agriculture
- Most countries import a high proportion of their total consumption of maize
- Weak maize seed industries, improved seed used in only about 21% of the area
- Since the 1960's, over 100 cultivars have been released, 85% with CIMMYT origin
- The 1980's is considered the lost decade for CA&C
- In the 1990's, bankruptcy and downsizing of the public sector, adoption of neoliberal macroeconomic policies, elimination of subsidies and price distortions, free trade initiatives, reduction of tariffs, etc., that will affect the economic environment for maize production
- And recently, crisis in the CG and NARS under modernization and restructuring schemes of reduction in size, a service oriented approach, privatization of extension services, etc.

Regional statistics on maize in Central America

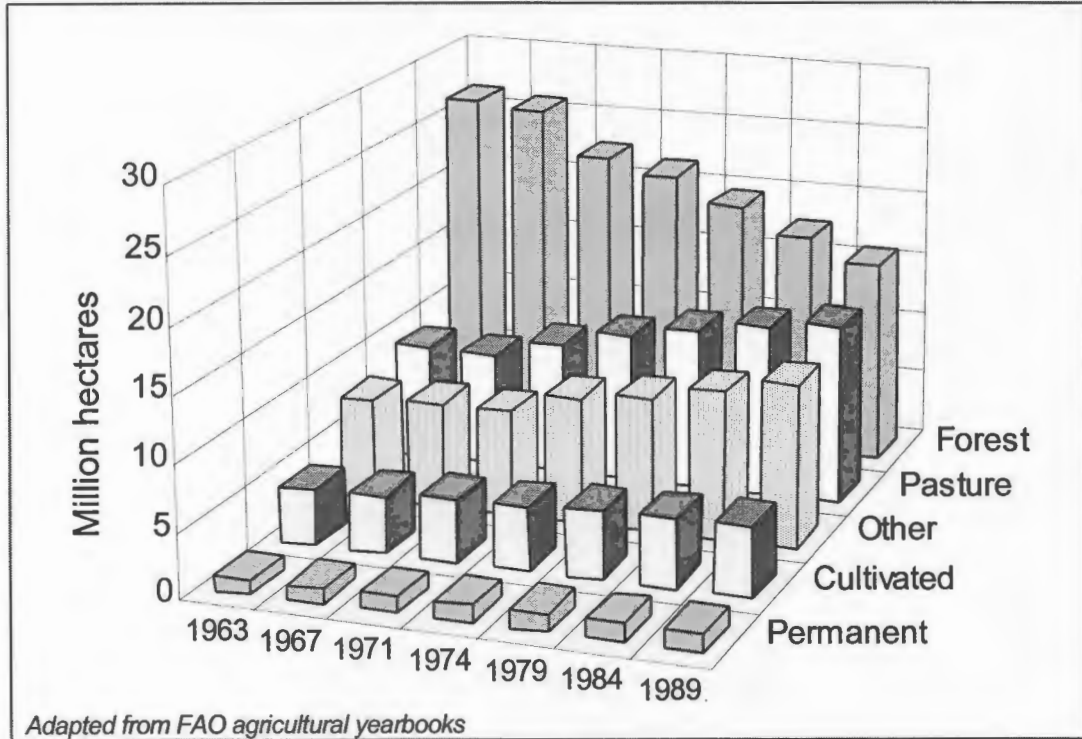
Country	Area 000 ha	Yield t/ha	Imports 000 t
Guatemala	646	1.9	126
El Salvador	303	2.0	75
Honduras	410	1.4	52
Nicaragua	205	1.2	25
Costa Rica	31	1.8	242
Panama	75	1.3	74
Haiti	170	0.8	2
Cuba	77	1.2	303
Dominican Republic	35	1.4	440

Source: 1993/94 World Maize Facts and Trends, CIMMYT

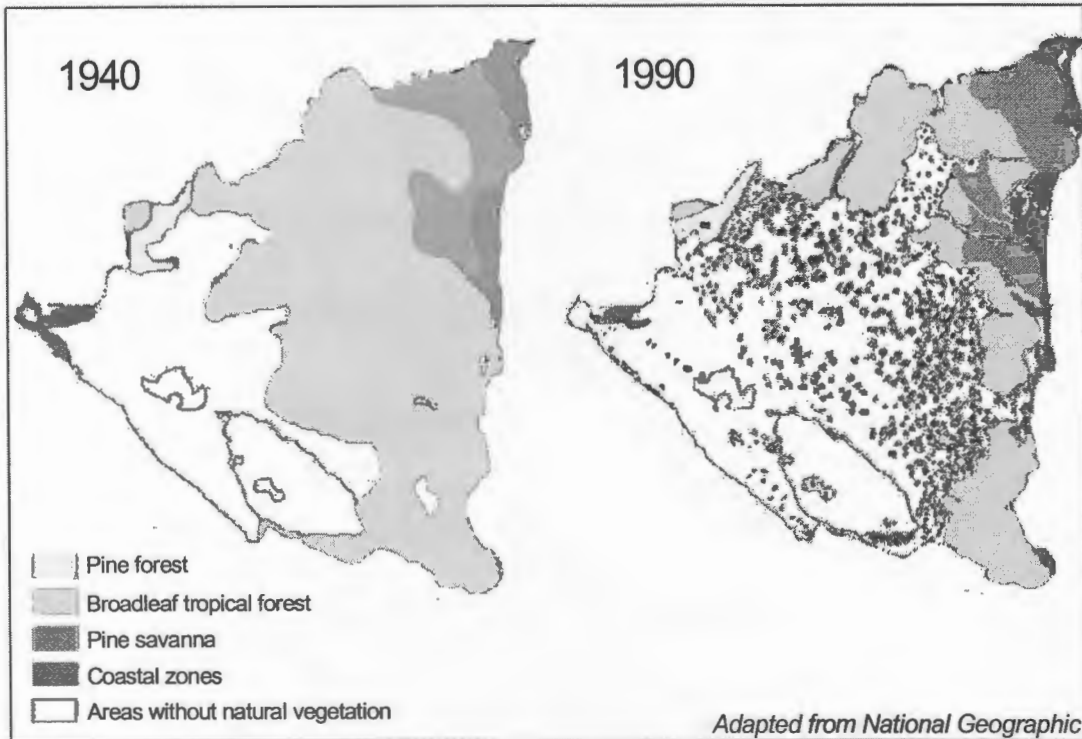
Agricultural trends in Central America



Changes in land use in Central America



Deforestation in Nicaragua



2. Historical perspective of the Regional Maize Program

Beginnings of agricultural research in CA&C

1943	Rockefeller's Office for Special Studies established in Mexico US collects maize sources for resistance to <i>Helminthosporium</i> in Guatemala
1954	The <i>Programa Centroamericano de Mejoramiento de Maiz</i> (PCCM) is born, a collaborative network linking CA&C research to efforts in Mexico/Colombia—marking the <i>birth</i> of agricultural research in CA&C. The strong emphasis on germplasm exchange gave the program a regional nature from the beginning.
1954-61	Large scale collection and evaluation of maize germplasm in the region
1960	CA&C members begin developing improved varieties and the Rockefeller Foundation starts offering in-service training in maize research in Mexico
1960-62	The PCCM begins distributing uniform maize trials through the region. Gradually other crops join the program, evolving into today's PCCMCA
1963-66	CIMMYT is formally established
1966-74	CIMMYT assists national programs of CA&C offering improved maize germplasm and in-service training in maize research

1975-1977: Two year phase by IDB

IDB provides a 2-yr grant to CIMMYT for a regional maize program in CA&C
Emphasis on germplasm improvement and in-service training in maize research in Mexico

1978-1986: SDC begins its long-term support

1978 The Swiss Development Cooperation (SDC) begins to provide financial support to CIMMYT's regional CA&C maize program, uninterrupted up to the present.

During this phase:

- Strong emphasis on germplasm development and in-service training in Mexico
- Support to seed production and research, and of seed processing units to NARS
- Strong support to on-farm research (OFR) methodologies through bilateral country projects, led primarily by the Economics Program
- Strong support to the PCCMCA collaborative program

As a result of over 15 years of *sustained* support in-service training, germplasm improvement, and on-farm research methodologies, most NARS developed strong institutional capacities in these areas. Participating NARS released many improved maize cultivars during this period.

CIMMYT had 3-5 staff-years in this phase of 1978-86

1987-1989: *Incipient network components*

During this phase, the regional program changes strategy: a) devolution of germplasm improvement to NARS, b) increased emphasis on agronomic research and socioeconomic analysis; and c) participating NARS more active in the management and execution of research

The first representative bodies of the network are established:

1. *Comisión Regional Permanente* (CRP), one member per NARS & CIMMYT, acting as a legislative body, approving annual research workplans, budgets, etc.
2. *Comité Ejecutivo* (CE), elected by the CRP, acting as the executive branch
3. *Comité Técnico* (CT), CIMMYT's staff, to approve technical/ research issues

Research is organized around strategic collaborative regional projects:

1. *Strategic agronomic research*: a) P&S fertilization for volcanic soils; b) maize intercropping w/ legumes as green manure; c) conservation tillage
2. *Breeding for biotic/abiotic stresses*: a) tolerance to drought; b) tolerance to ear and stem rot; c) tolerance to corn stunt disease; and d) hybrid development. Seed production and research are incorporated within the breeding projects.
3. *Economics*: on-farm research, comparative analysis, policy issues

During this phase:

- CIMMYT initiates strategic agronomic research on natural resources and sustainability issues—first in the region, and consistent with CIMMYT's own strategic plan
- It also promoted creation of the *Mesoamerican Society of Agronomy* and its journal, *Agron Mesoamericana*; and was first to support NARS w/ microcomputers, software and Email
- Similarly, the Economics Prog. promoted creation of the Socioeconomics Regional Network
- However, the regional programs in breeding, agronomy and socioeconomics operated with relatively poor coordination, almost as three independent programs

CIMMYT had >5.0 staff-years during the phase 1987-89 (highest level ever)

1990-1991: *The painful transition*

CIMMYT and SDC agree in a 2-yr transition phase, where changes are to be implemented:

- Transfer of administrative responsibilities to PRM internal bodies (CRP, CE)
- Methods of participatory planning by objectives (PPO, ZOPP)
- Projects with clear defined leadership and participation by NARS and CIMMYT
- Assignment of budgets per country and per project
- Increased agronomic research integrated with socioeconomic analysis

- Drastic reduction of CIMMYT staff from 5 to 3
- Devolution of maize breeding to NARS, the maize breeder returns to Mexico

In 1990, the PRM holds its first participatory planning meeting by objectives (PPO), defining the matrix for the 2-yr transition phase, but it led to some friction between CIMMYT and SDC staff

In 1991, at SDC and CIMMYT's request, E.Schaltegger led an External Review of the PRM's efficiency, efficacy, pertinence and sustainability. The Review recommended a new 5-yr phase and the PRM's restructuring to transfer administrative responsibilities to the network's internal structures. The Review also looked at the potential for duplicity with newly established PRIAG, EEC-funded project to support food grains research/extension; and CIAT's hillside initiative

Therefore, a strategic planning meeting in Sept. 1991 was held, and defined a 5-yr planning matrix for PRM activities as well as the proposed reorganization and governing statutes: a) the position of Regional Coordinator for the PRM's administration and financial management; b) a Supervisory Committee; and c) to close the CE and to enlarge the CT. The regional program is formally named PRM for the new phase.

CIMMYT had 3 staff-years during this phase of 1990-91

1992-1994: Formal birth of the PRM as a network

Although the planning matrix is for 5 years, SDC only approves funds for a 3-yr phase

With guidance and support from SDC, the PRM gradually and successfully adopts:

- methods of participatory planning by objectives (Pouf's, POA's)
- projects with defined level of participation (leader, co-leader) by CIMMYT/NARS
- budgeting by country and by projects
- network bodies: CRP, CT and Regional Coordinator
- transfer of responsibilities to network bodies and NARS—empowerment

As the first Regional Coordinator (R.Urbina, Nicaragua) assumes his post, full administrative responsibilities for network management are not completely transferred, but gradually a sensible division of labor between the Regional Coordinator and CIMMYT develops

During this phase:

- There is further reduction in CIMMYT staff (3 to 2)
- CIMMYT and SDC regional staff develop very close working relationships
- CIAT-Hillside project for Central America initiates operation (funded by SDC)
- CIMMYT establishes a Natural Resources Group, w/ links to CIAT's ecoregional initiative
- PRIAG upsets the institutional balance: lots of funds to NARS for OFR, thematic research, extension, etc., but inadequate follow-up leads to poor quality. The PRM hands over OFR.
- The PRM is recognized *source* of scientific quality in the region
- The PRM provides office space to PROFRIJOL's socioeconomist for 3 years

CIMMYT had 2 staff-years during this phase 1992-94

1995-1998: A model of partnership and mature network

Current 4-yr phase is product of a strategic planning meeting in Sept.94 in Guatemala.

For this meeting, the PRM convokes most of the agricultural research projects in the region (many financed by SDC) to explore inter-institutional collaboration and to sketch a common agenda for agricultural research in Central America.

However, despite fulfilling the project's objectives with efficiency, efficacy, participation and empowerment, SDC again reduces PRM funds (25%, 22% absorbed by CIMMYT) and staff (2 to 1), the CIMMYT economist being supported with assorted funds (SDC, BMZ, Ford, etc.)

Nevertheless, during the phase:

- PRM has mandate to foster common agenda and alliances with new strategic partners
- Regionally, inter-institutional collaboration increases with sketches of a common agenda
- SDC praises the PRM for efficient, effective and pertinent operation model (Walter Fust)
- SDC increasingly involves J.Bolaños in other issues, demonstrating increased trust
- SDC posts a Swiss Associate Expert (Pre-doctoral Fellow) to the PRM—Jerome Fournier
- E. Durón (Honduras) becomes Regional Coordinator, and later relocates to Guatemala for increased administrative efficiency (approved by the CRP and SDC)
- CIMMYT transfers more responsibilities to PRM network bodies, NARS and local staff
- PRM focuses on improving both productivity and the natural resource base (win-win)
- Research agenda is mainly a continuation from the previous two phases

Despite continuous reductions in funds and staff, the PRM maintains: 1) high level of quality *output*; 2) strong *convening* power; 3) *modus operandi* of empowerment, 4) *source* of scientific leadership; and finally, 5) the PRM is recognized by SDC as a successful model of *partnership*

CIMMYT had 1 staff-year during the phase 1995-98 (and 1 staff-year with assorted funds)

1999 - ???? PRM's challenge: self-sustainability?

The current PRM phase ends Dec.98. SDC's preliminary proposals:

May/June 98—PRM's progress report and External Review to examine the current operational scenario and serve as input for planning the next phase.

The current scenario features crisis in NARS with downsizing and restructuring, crisis in the CG system and an increased role of NGO's. Uniform adoption of neoliberal macroeconomic policies, free trade and elimination of tariffs, legislation on intellectual property rights, etc. across the region, which most likely will affect the economics of maize production

Sept 98—strategic planning meeting for 3-4-yr phase, perhaps jointly with PROFRIJOL?

3. PRM's structure and participating institutions

The PRM is a collaborative network for maize research of nine national agricultural research programs and CIMMYT, with governing statutes and representative bodies. CIMMYT is the executing technical agency with financial support by Swiss Development Cooperation (SDC).

Participating national institutions:

Guatemala: ICTA, Instituto de Ciencias y Tecnología Agrícolas
El Salvador: CENTA, Centro Nacional de Tecnología Agropecuaria y Forestal
Honduras: DICTA, Dirección de Ciencia y Tecnología Agrícola
Nicaragua: INTA, Instituto Nicaragüense de Tecnología Agropecuaria
Costa Rica: MAG, Ministerio de Agricultura y Ganadería
Panamá: IDIAP, Instituto de Investigación Agropecuaria de Panamá
República Dominicana: SEA, Secretaría de Estado de Agricultura
Cuba: IIHLD, Instituto de Investigación Hortícola Liliانا Dimitrova
Haití: CRDA, Centre de Recherche et de Documentation Agricoles

PRM structure and organizational bodies:

1. *Regional Permanent Commission (CRP)*: composed of National Maize Coordinators and CIMMYT, acting as the legislative body approving the annual workplan and budgets during the annual planning workshop. It is represented by an elected President.
2. *Technical Committee*: composed of all PRM's maize researchers and CIMMYT staff, to plan the research agenda and to provide technical and scientific backup for research.
3. *Regional Coordinator*: full-time staff to supervise, coordinate and monitor execution of the workplan and approve disbursement of funds to NARS, etc. He/she reports to the CRP.
4. *Supervisory Committee*: composed by the CRP President, SDC and CIMMYT, and convenes to resolve irreconcilable issues between PRM bodies and/or other issues.

4. PRM's planning matrix 1995-1998 phase

The planning matrix centers on 41 activities that will permit attainment of 6 proposed results, and in turn, the project's main objective: "*the development and partial adoption of sustainable agricultural technological alternatives*". The superior goal is: "*to increase the productivity and sustainability of the most important maize cropping systems of the region*".

The 6 results are:

- R1. The performance of maize cultivars under biotic and abiotic stresses has been improved
- R2. Crop management technologies for increasing productivity while conserving or improving the natural resource-base (soil, water and nutrients) have been generated and validated
- R3. The technological alternatives generated by the PRM and the technological change related to the PRM's objective and superior goal have been socioeconomically evaluated
- R4. The PRM's capacity to conduct pertinent and effective research has been sustained and improved, and also the capacity for training others established
- R5. Efficient and effective collaboration has been established with akin partners
- R6. PRM bodies function adequately and the technical and administrative tasks are conducted with efficiency and efficacy.

5. PRM's research agenda

1. ***Germplasm development*** with improved performance under the main biotic/abiotic stresses of the region (mainly OPV's, but not excluding hybrids), and of hybrids with high yield potential for favorable environments. It has several sub-projects:
 - a) inbred and hybrid development
 - b) drought tolerance
 - c) tolerance to corn stunt disease
 - d) tolerance to ear and stem-rot
 - e) physiological studies of genetic gain

2. ***Generation and validation of crop management technologies*** to increase productivity while conserving or improving the natural resource-base (soil, water and nutrients)
 - a) density and nitrogen responses of elite germplasm
 - b) yield components and their variability in maize cropping systems
 - c) simulation modeling and GIS for maize production systems
 - d) insertion of legumes as intercropping, relay or rotation w/ maize
 - e) conservation tillage and residue management (mulch x N)
 - f) improving crop nutrient use efficiency (N-urea, P & S)
 - g) generation of recommendations from all research sub-projects

3. ***Socioeconomic evaluation*** of technological changes related to PRM's aim and objectives
 - a) *ex-ante* analysis of technological alternatives from breeding and agronomy
 - b) *ex-post* analysis determining technology adoption and impact

Rationale for agronomic research

Sustainable maize systems for the poor—CIMMYT's motto? For the PRM, the aim must be the generation of wealth from agriculture and not the sustainability of low yields and poverty

Productivity with conservation—PRM's motto? To maximize productivity while minimizing the depreciation of the resource-base, or alternatively, to provide technological alternatives aimed at increasing productivity while conserving and/or improving the resource-base

The PRM's strategic agronomic research aims to develop *prototype* recommendations with broad adaptability and a solid scientific basis, while maintaining sufficient plasticity to fit in the wide range of maize production systems of the region.

Regional PRM trials, with a common set of core treatments, and freedom to add treatments of local interest, allow for the fast generation of robust agronomic conclusions, given the wide range of testing sites within the PRM. Trials are maintained as long as possible in projects addressing issues of *sustainability*, which by necessity, require a long-term approach.

The technical components being promoted by the PRM are: a) use of good germplasm w/ good seed quality; b) use of appropriate planting arrangement and density; c) management of crop residues and conservation tillage; d) intercropping, relay or rotation of legume cover crops in maize cropping systems; e) efficient use of inorganic fertilizer; f) matching crop phenological characteristics to cropping and climatic patterns, etc.

6. PRM activities through the year

Annual planning meeting and participation in PCCMCA

- The PCCMCA is the annual meeting of the Mesoamerican Society of Agronomy, with over 300 participants from many regional agricultural research institutions, projects, networks, etc. to present their research results, plan collaboration, exchange information, etc.
- The PRM sponsors over 30 participants who present over 35 papers w / research results
- PRM's collaborative activities for the upcoming year are planned concurrently, and set down formally in the annual operational workplan (POA), the blueprint for all PRM activities

Elaboration of research reports and publications

- High quality editing, layout and publication of *PRM's Synthesis of Experimental Results*, with more than 30 papers presenting the PRM's most outstanding research results
- Experimental data entry, analysis, and interpretation leading to the production of research papers, reports and presentations
- Update of PRM's database with new experimental results

Support, consulting and training to NARS

- Direct tutoring, consulting, etc. with abundant traveling through the region
- Offering of in-service training in maize breeding (CIMMYT-Mexico) and crop management research (in collaboration with EMBRAPA-Brasil)
- Offering of regional courses, seminars, workshops, etc. Lately, only offering the course "Experimental design and analysis using microcomputers"
- Workshops for research planning, data analysis, interpretation of results, etc., with selected members and projects of the PRM
- Workshops for restitution of results to NARS, policy-makers, shareholders, etc. with feedback into the research process

Monitoring execution of workplan and establishing progress

- Annual workplan is executed by participating countries with funds disbursed according to progress determined by the National and Regional Coordinators

7. Some PRM achievements

- Participating NARS through the PRM have acquired national *seed security*
- Considerable free flow of germplasm among PRM countries
- Constant release of cultivars by participating members, >100 since start of collaboration, >85% with CIMMYT origin, many with tolerance to biotic and abiotic stressed, and the world's best source of resistance to corn stunt disease
- The PRM has developed and validated many technologies: OFR methodologies; economic and statistical analysis; yield components and their relationships; intercropping, relay or rotation of legume green manure cover crops with maize; residue management and conservation tillage; doses, methods, and sources of N, P and S; use of chlorophyll meters for N diagnosis; planting arrangement and density; etc.

- Production of many training manuals, methodological studies, case studies, including in-house software for experimental design and analysis using microcomputers, used widely by CA&C NARS of all disciplines, in South America, Mexico, Africa and Asia.
- Systematic publication of research reports of high quality, presentation of research results in many regional forums, and possession of a 10-year database of experimental results
- Sustained and constant strengthening of NARS—hundreds have received in-service training, regional courses, one-to-one tutoring, postgraduate degrees, etc.
- Notable integration in breeding, agronomy and socioeconomics
- The PRM is considered *source* of scientific leadership
- PRM national maize staff usually excel in science, quality, output, work, etc.; and also get promoted to NARS directing positions more times and faster than staff in other disciplines
- **CIMMYT and the PRM are the clear *trend-setters* in the region**

8. Examples of PRM impact

Development of corn stunt tolerant germplasm in Nicaragua

In Nicaragua's Pacific region, 60% of total area and 80% of farmers (80-100 thousand ha) use NB6 or NB12, cultivars with tolerance to corn stunt disease, and this disease is spreading quickly through Mexico & S. America—PRM has source of resistance
Genetic tolerance to stunt provides yield gains of 1.0-1.5 t/ha over susceptible cultivars
Several studies have confirmed annual impact of U\$ 3-5 million in grain produced

Widespread hybrid use in El Salvador

In the country, 60-70% of total area is planted to hybrids, w/ highest regional yield
Hybrids outyield OPV's by at least 1.0-1.5 t/ha
Thus, it is easy to show returns in U\$ millions per year for development of hybrids

Promotion of conservation tillage through Guaymango, El Salvador

Guaymango is an area of 5 thousand ha with a maize-sorghum cropping system
Adoption of no-burn, use of crop residues as mulch, hybrids, and modest levels of fertilizer, gradually increased maize yields from 1.0 to 4.0 ton/ha (1970's to-date) while improving soil characteristics and properties
Guaymango has become the *focal point* for the promotion of soil conservation practices to thousands of farmers, extension workers, NGO's, etc., by direct visits and farmer-to-farmer transmission, and also by sponsoring Guaymango's "conservation tillage fair"

Conservation tillage in Azuero, Panama

Azuero, Panama, an area w/ 10 thousand ha of mechanized maize
In 1985, CIMMYT imparted a OFR course on conservation tillage and also donated the first minimum tillage planter to IDIAP—first time in the area
By 1996, 10 years after the intervention, because of IDIAP's promotion of this type of technology through research/extension, there is almost 60% adoption (6-8 yr. for 100%).
Benefits: reduced costs, reduced weeds, reduced herbicides, soil conservation

Intercropping canavalia in alternate rows of maize in Azuero, Panama

10 years of research in maize-canavalia (1988-1997) have generated very promising alternatives for Azuero, and rapid adoption of canavalia is beginning to occur. Compared to the original system of monocropped maize, the identified intercropping systems have >200 to 500% economic return, elimination of a noxious weed, substitution of N-fertilizer, enrichment of fodder for animal feeding, and the long-term and gradual improvement of soil properties

Seed stock loss during Panama's US invasion

All stocks of IDIAP's genetic material were rampaged and looted during the US invasion. The PRM quickly supplied IDIAP with remnant seed, allowing seed production for the upcoming season, made possible because of the PRM's free exchange of germplasm. The PRM has provided national *seed security* to participating countries

Continuity in face of institutional turnover

During many years, NARS operational capacities have been curtailed by limited resources, instability and staff turnover, with clear negative impacts on research results. CIMMYT/PRM have been critical to long-term maize research by providing a *durable* focal point for *drawing together* NARS researchers and providing the conditions conducive for their professional development, scientific quality, and long-term survival within NARS

9. Ingredients for success

The PRM is a *mature* collaborative network resulting from a long-term and continuous working relationship between the Central American national maize program researchers and CIMMYT, impossible without the *sustained* support of the Swiss Development Cooperation (SDC)

CIMMYT has posted regional staff with high scientific quality, professionalism and personal compromise to the shared goals of promoting agricultural development in the region

The PRM's constant *modus operandi* of empowerment with the resulting sentiment of ownership and personal compromise, inciting all participants in carrying out the process and achieving its outcome, is clearly important for success—true *partnership*

NARS directing staff have constantly supported PRM activities and freed them from unnecessary bureaucratic interference

The long-term investment in NARS training (including one-to-one working with CIMMYT) has developed researchers with high scientific quality, work capacity and personal compromise

In essence, the PRM is a cost-effective model for horizontal collaboration between international and national institutions, with little bureaucratic interference, promoting broad participation with low transaction costs, featuring free exchange of germplasm and technology, with emphasis on improving productivity and the natural resource base, and the resulting impact at the farm level

10. PRM's inter-institutional collaboration

Given the many agriculture projects in the region (many financed by SDC), the PRM increased its effort to develop inter-institutional collaboration. The PRM initiated the effort to develop a common agenda, but CIAT/IFPRI convened to the first formal meeting for inter-institutional collaboration in hillside agriculture—the *Trujillo meeting*

PRM's collaboration with other regional projects:

CIAT-Hillsides	Strategic agronomic research; modeling and GIS Project financed by SDC, IDRC, others Offices in Honduras and Nicaragua International staff H.Barreto (80% CIAT, 20% CIMMYT)
PROFRIJOL	Bean collaborative network sister to PRM Project is financed by SDC PRM provided free office to socioeconomist Collaboration in training, economics, coordination
PASOLAC	Support to NGO's in hillslope sustainable agriculture Financed by SDC through Intercooperation Works in Nicaragua, Honduras, El Salvador Active collaboration in validation, training, workshops
FOMENTA	Project for promotion of animal traction, SDC-financed Limited collaboration, mostly logistics and liason service
PRIAG	EEC funded project, currently in standstill Based at IICA-Costa Rica, works all C.America
IFPRI-Hillsides	Project for policy issues in hillslope agriculture Operated in Honduras, but recently closed Collaboration in joint workshops for policy options
IICA-Hillsides	Project for institutional issues in hillslope agriculture Financed by Dutch, works El Salvador and Honduras Active collaboration, joint workshops on policy and institutional issues
P-ONG	Proyecto ONG, SDC funded thru Intercooperation Promote hillside sustainable agriculture Collaboration in workshops, validation, links to NGO's
Postcosecha	Project to promote grain post-harvest management Financed by SDC, PRM assisted w/ technical issues

11. EPMR's terms of reference for CIMMYT

1. Role CIMMYT staff play in the region

- a) Long-term CIMMYT involvement in the region, providing a *durable* focal point for drawing together maize researchers *in lieu* of an almost permanent operational incapacity and instability of NARS; impossible without the *sustained* and long-term support by SDC
- b) CIMMYT is the clear *trend-setter* in the region, on research, science, partnerships, etc.
- c) CIMMYT/PRM are considered *source* of scientific leadership in the region
- d) A clear role to promote sound, effective, efficient, pertinent, etc. research
- e) A clear role to provide support, training, consulting, etc., to strengthen NARS
- f) A clear role in management of the PRM project and negotiate future phases and grants

2. Support by host country

- a) CIMMYT is considered a loyal friend by NARS Directors
- b) CIMMYT's role is more technical than political, with limited need to access political levels
- c) NARS Directors protect CIMMYT's maize collaborators as much as possible from instability
- d) There are good working relationships w/ NARS staff across the region
- e) Freedom for mobility and communication is the same as for any other citizen
- f) CIMMYT has better communication facilities than ICTA, often without communications
- g) The PRM's research agenda is the product of participatory planning where the "correct" research needs are determined as *objectively* as possible, to address the identified primary problems facing maize production. In a sense, it's not CIMMYT's or NARS's agenda
- h) The PRM emphasizes strategic over local adaptive research or extension, and is focused on the strategic plan governing activities.

3. Examples of the regional program's success and impact

- a) Many of these were given earlier in the presentation.

4. Difficulties and obstacles in achieving objectives

- a) Permanent instability in NARS operational capacity which hinders long-term sustainability
- b) Macroeconomic conditions facing resource-poor farmers and maize production limit the adoption of technological options and possible impact
- c) General realities of underdevelopment and poverty

5. Favorable factors in achieving objectives

- a) Good planning process for setting achievable objectives given resources and time-frame
- b) PRM's modus operandi—partnership, empowerment, good research agenda
- c) Long-term relationship between CIMMYT and NARS—good working relationship

6. Relationship between the outreach office and HQ in Mexico

- a) Excellent in many respects
- b) The regional program gets ample scientific support from HQ (and financial when feasible)
- c) HQ trusts outposted staff with ample operational freedom
- d) Financial arrangements are satisfactory, the outreach office has full management of the account and decision-making power regarding use of funds
- e) Personnel promotion policies don't formally exist, given the small size of the outreach office. Staff are promoted thru empowerment, personal development and salary increases

- f) Communication facilities are satisfactory.
- g) The office working environment is also very satisfactory.
- h) The regional program has good agreement with CIMMYT's long-term strategies and planning. In fact, the PRM has pioneered some operational and research aspects
- i) Currently there is no excessive reporting to HQ, but it could increase with the new Megaproject structure, as staff may operate under several layers of administration

7. Is collaboration with other CG centers in the region effective?

- a) Given CIAT's new role as convening center for ecoregional research on hillslope agriculture for Central America, some friction developed in the early implementation stages of this approach. The PRM pioneered strategic agronomic research on legume cover crops, residue management, conservation tillage, etc., since the late 1980's, much earlier than CIAT's ecoregional role. However, friction no longer exists, and current workplans are clearly complementary, in accordance to each project's comparative advantage
- b) The only other CG center active in the region is CIP, which participates in the potato collaborative network PRECODEPA, also financed by SDC. Plans for collaboration have been discussed related intercropping of maize and sweet potato

12. EPMR's terms of reference for NARS

1. Antecedentes de la Evaluación Externa

Como Usted sabe, CIMMYT es miembro del Grupo Consultivo Internacional para la Investigación Agrícola (GCIIA), una asociación informal de más de 50 países miembros y donantes que apoyan a una red de 16 centros internacionales de investigación en agricultura, ciencia forestal y pesca, con la finalidad común de promover la agricultura sostenible y la seguridad alimentaria en los países en vías de desarrollo.

Para asegurar la transparencia del manejo de los recursos asignados a cada centro, el GCIIA tiene un Programa quinquenal de Revisión Externa de los Programas y la Administración de los centros (EPMR, External Program and Management Review), organizada por el Comité Técnico Asesor (TAC, Technical Advisory Committee). El objetivo es confirmar que el centro ejecuta su trabajo con eficiencia, efectividad, pertinencia y de acuerdo a los lineamientos generales del GCIIA. Este año, CIMMYT está sometido a un EPMR (equipo de 5 miembros), quienes ya visitaron la sede de CIMMYT en México y varias oficinas regionales en Africa y Asia. Sin embargo, a última hora, el equipo revisor decidió incluir una visita al programa regional de CIMMYT en Centro América como parada en su viaje final a México, donde presentarán a fines de Noviembre su reporte final a los directores y personal del centro.

Hemos sido informados que tres miembros del equipo revisor visitarán el programa de CIMMYT en Guatemala los días 10 y 11 de Noviembre, llegando el domingo 9 y saliendo hacia México el martes 11 por la noche. Obviamente, dos días es muy poco tiempo para una revisión exhaustiva del PRM, por lo que decidimos concentrar las actividades en la oficina de CIMMYT en Guatemala, sin incluir visitas de campo o a otros países. Para el éxito de esta reunión es muy importante que nos preparemos de antemano y podamos usar efectiva y eficientemente el corto tiempo disponible.

2. Miembros del Equipo Revisor

Dr. Antonio Bahía, Director General, EMBRAPA/CNPMS, Brasil
fax (55-31) 779-1088 bahia@cnpms.embrapa.br

Mr. Barrie Keenan, Keenan Consulting, New Zealand
fax (415) 833-6626 BarrieKeenan@compuserve.com

Dr. V.S. Vyas, India
fax (91-141) 519938 visquar@jp1.vsnl.net.in

3. Términos de Referencia Generales

En general, evaluar la operación de CIMMYT en la región en los siguientes temas:

- La misión, la estrategia y las prioridades del centro en referencia al ambiente operativo e institucional de la región, su coherencia con los objetivos del GCIIA (alivio a la pobreza, manejo de recursos naturales, seguridad alimentaria sostenible), relevancia para la población meta beneficiaria (en especial para mujeres rurales), y la selección de socios apropiados en la formulación e implementación de su misión.
- La calidad y relevancia de la investigación científica practicada por el centro, así como la efectividad de los procesos de planificación, establecimiento de prioridades y control de calidad en la agenda de trabajo.
- La efectividad y la eficiencia administrativa del centro, incluyendo aspectos sobre la estructura organizacional del centro en la sede (Consejo Directivo, Programas, etc.), los mecanismos para el manejo y la coordinación de los programas y proyectos de investigación, la disponibilidad de recursos para cumplir los objetivos establecidos y la efectividad de las relaciones del centro con sus socios contrapartes.
- Los logros y el impacto obtenido, tanto en los aspectos investigativos como en la efectividad del centro en su impacto y contribución a la misión y los objetivos del GCIIA.

4. Términos de Referencia Específicos

El equipo revisor está interesado en los aspectos administrativos típicos de una oficina regional, como los arreglos financieros, la contratación de personal, comunicaciones, la contribución a la misión del GCIIA, métodos de planificación y desarrollo de la estrategia operativa, supervisión por la central, el ambiente de trabajo, etc. El equipo revisor ha solicitado que las presentaciones del personal de CIMMYT y los programas nacionales se agrupen bajo las siguientes áreas, para facilitar la comprensión y la síntesis de la información:

- a) investigación;
- b) capacitación;
- c) enlaces y redes (networking);
- d) administración.

5. Términos de referencia específicos para los miembros de los programas nacionales

1. Cómo han sido apoyados por CIMMYT?
 - Conocimiento
 - Servicios
 - Material
 - Capacitación
 - Enlaces (networking), etc.?
2. Cómo es la interacción con CIMMYT?
 - Discusión con el personal del programa regional del centro?
 - Visitas a CIMMYT y por personal de CIMMYT?
 - Talleres, seminarios, etc.
3. Están satisfechos del nivel de contribución de CIMMYT a la agenda del Programa Nacional?
4. Están satisfechos de la respuesta del CIMMYT a sus sugerencias y peticiones?
5. Cual de las contribuciones de CIMMYT tiene prioridad para los Programas Nacionales?
6. Cómo se diseminan las contribuciones de CIMMYT en la región?
7. Cómo califican al programa regional de CIMMYT?
 - Calidad científica
 - Relevancia
 - Capacitación
 - Apoyo general, etc.

6. Confidencialidad

Estimado colega del PRM, Usted deberá hablar con el equipo revisor con absoluta libertad y honestidad sobre la manera de trabajar de CIMMYT y cualquier otro asunto que el equipo revisor quiera examinar. Sus comentarios recibirán absoluta confidencialidad de parte del equipo revisor. Estas evaluaciones externas a los centros que operan bajo el GCIIA son importantes porque permiten a los programas nacionales y los grupos beneficiarios retroalimentar los niveles de decisión del GCIIA sobre el accionar de los centros que maneja.

Aquí en Centro América, CIMMYT trabaja fundamentalmente a través del PRM, donde los métodos de planificación participativa, la elaboración de planes operativos anuales con indicadores objetivamente verificables, los mecanismos de seguimiento y evaluación interna, la presupuestación por proyecto y por país ejecutante, la institucionalización de órganos administrativos propios de la red, etc., han sido implementados desde hace varios años, con la supervisión y el apoyo decidido y sostenible de la Agencia Suiza para la Cooperación y el Desarrollo (COSUDE), el principal agente financiero del PRM. No me cabe la menor duda que el PRM saldrá exitoso de esta evaluación externa por el GCIIA.

Sé que Ustedes tienen una agenda de trabajo bastante cargada y participar en esta reunión bajo un horario bastante apretado exige cierto sacrificio. Por tanto, en nombre de CIMMYT y el mío propio, quiero expresar de antemano mi profundo agradecimiento por su voluntad de asistir a esta reunión. Favor confirmar su disponibilidad de participar a la más brevedad posible y poder finalizar los arreglos logísticos necesarios.

7. Agenda

Domingo 9 de Noviembre

Llegada del equipo revisor, recepción en aeropuerto y traslado al Hotel

Lunes 10 de Noviembre

- 8:00 - 1:00 Presentaciones y Discusión con Personal de CIMMYT
Presentaciones y discusión general entre el equipo revisor y el personal regional de CIMMYT. En estas participarán Jorge Bolaños, Gustavo Saín, Hector Barreto, Jerome Fournier, Monika Zurek, Miriam Hernández y William Quemé.
- 1:00 - 2:00 Almuerzo
- 2:00 - 5:00 Continuación
- 7:00 - 9:00 Reunión con Giancarlo de Picciotto, COSUDE (sin personal de CIMMYT)

Martes 11 de Noviembre

El equipo revisor se reunirá con el personal de los programas nacionales sin la presencia del personal de CIMMYT para asegurar la confidencialidad y libertad absoluta en las discusiones. Se proveerá un traductor profesional (español-inglés).

- 8:00 - 9:00 Relación con el país anfitrión, Guatemala
Baltazar Moscoso, Gerente General ICTA
Mario Fuentes, Coordinador Programa Maíz
José Luis Zea, Agrónomo Maíz
Fernando Aldana, Coordinador Programa Trigo
- 9:00 - 9:45 Relación con los Organos Administrativos del PRM
Elio Durón, Coordinador Regional del PRM
Mario Fuentes, Presidente de la CRP
- 9:45 - 10:30 Visión de los Directores de Programas Nacionales
Baltazar Moscoso, Gerente General ICTA, Guatemala
Róger Urbina, Director General, INTA, Nicaragua
Leopoldo Alvarado, Sub-Director General, DICTA, Honduras
- 10:30 - 1:00 Investigación, impacto, logros, operación
Róger Urbina, líder tolerancia al achaparramiento
Leopoldo Alvarado, líder tolerancia a pudrición de mazorca
Mario Fuentes, líder en híbridos y maíz de altura
José Luis Zea, líder en labranza de conservación
Román Gordón, líder en inserción de leguminosas, fertilización P/S
Cristina de Choto, líder estudios de adopción, talleres de política
Abelardo Viana, economista de PROFRIJOL
- 1:00 - 2:00 Almuerzo
- 2:00 - 6:00 Discusión general y elaboración del documento por el equipo revisor
- 6:30 Salida al aeropuerto del equipo revisor, vuelo a México de KLM 746 a las 20:30

13. Planning Matrix for the Regional Maize Program for Central America and the Caribbean for the period 01.Jan.95 to 31.Dec.98.

Descriptive Summary	Objectively Verifiable Indicators	Important Suppositions
<p>Superior Goal: To increase sustainably the productivity of the most important maize cropping systems of the region.</p>	<p>IF 1 By 1998, in the specific areas of influence of the PRM farmers who have adopted sustainable technologies achieve at least 15% increase in productivity.</p>	<p>There are no massive imports of grains Grain production is minimally profitable</p>
<p>General objective: The development and partial adoption of sustainable agricultural technological alternatives</p>	<p>IO 1: From 1995 onward, at least 80% of activities conducted by NARS in their validation programs have a sustainability focus IO 2: In areas of concentration of the PRM, the area planted to maize with adoption of validated and generated PRM technologies increases by at least 20% up to 1998. IO 3. In each participating country, the area planted to maize with a sustainability focus reaches a minimum of 50% by 1998. IO 4. For 1998, 20% of PRM's activities in sustainable agriculture are conducted in areas of agricultural frontier.</p>	<p>Extension systems do function. There is availability of inputs.</p>
<p>Results: R1. To improve the performance of maize germplasm under the important biotic and abiotic stresses of the region.</p>	<p>IR 1.1 Up to 1998, each participating NARS has developed at least one cultivar (hybrid/OPV) (white/yellow grain), which outyields the best available check at least 10% in regional trials and/or expresses its potential in different production areas with emphasis to drought, stunt and ear-rot tolerance. IR 1.2:Up to 1998, the rate of genetic progress of the PRM's breeding programs thru 1995/1999 has been estimated. IR 1.3:Up to 1998, the PRM germplasm has been conserved. IR 1.4 Up to 1998, 2/3's of participating NARS possess at least one cultivar generated by the PRM which is superior to the best available commercial check.</p>	
<p>R2. To generate and partially validate crop management technologies which increase productivity and conserve and/or improve the natural resource-base</p> <ul style="list-style-type: none"> • Agronomic management of germplasm • Use/validation of crop simulation modeling. • Insertion of legumes into maize production systems. • Residue management in maize production systems. • Efficient use of fertilizers in production systems. • To characterize the maize production systems in agronomic, socioeconomic and geographically 	<p>IR 2.1 Up to 1998, recommendations for density and N have been generated for the newly developed elite PRM germplasm. IR 2.2 Up to 1998, crop simulation models have been validated and adapted to the maize production systems of the region. IR 2.3 Up to 1998, at least 10 new legume species have been evaluated as intercrops, relay or rotation with maize. IR 2.4 Up to 1998, nitrogen and water balances have been determined in at least four studied maize production systems. IR 2.5 Up to 1998, a feasible recommendation for inorganic N fertilizer application has been generated which increases its efficiency of uptake at least by 10% over current values. IR 2.6 Up to 1998, specific recommendations have been generated for each identified sustainable technological component. IR 2.7 Up to 1998, IFDC (IBSNAT) conducts a training workshop on crop simulation modeling in the region.</p>	

Descriptive Summary	Objectively Verifiable Indicators	Important Suppositions
<p>R3. To evaluate socioeconomically the technological alternatives being generated by the PRM, and the process of technical change in relation to the PRM's superior goal and objectives.</p>	<p>IR 3.1 Up to 1998, at least four maize production systems have been characterized in their geographic, agronomic and socioeconomic terms, and identifying at least four of the most limiting factors in each.</p> <p>IR 3.2. Up to 1998, at least 75% of the long-term experiments have been evaluated socioeconomically.</p> <p>IR 3.3. Up to 1998, at least two studies in policy issues and two in research/extension issues have been developed.</p> <p>IR 3.4. Up to 1998, at least four workshops at the national level (two on policy and two on research/extension) and at least one at the regional level have been developed.</p> <p>IR 3.5. Up to 1998, at least two impact studies of PRM's technologies have been done.</p> <p>IR 3.6. Up to 1998, at least three adoption studies have been conducted, and in each one, identified at least two factors for implications to research and policy.</p> <p>IR 3.7. Up to 1998, at least two documents are available on the function of public and private sector in seed production and distribution.</p>	
<p>R4. To sustain or improve the capacity to conduct effective research on the methodological issues related to PRM's activities, and a potential for training and effective communication among researchers accomplished.</p>	<p>IR 4.1. Starting In 1995, an inventory of PRM's training needs is available.</p> <p>IR 4.2. Up to 1998, three training manuals and one audiovisual material have been elaborated.</p> <p>IR 4.3. Up to 1998, the PRM has participated or offered directly in at least 12 training events.</p> <p>IR 4.4 Up to 1998, the Regional Coordinating office procures funds for conducting at least one training event.</p> <p>IR 4.5. Up to 1998, at least 4 PRM researchers have been trained at MS/PhD level with permanent staffing arrangements within the NARS.</p>	
<p>R5. Establishment of sustained mechanisms for efficient cooperation among akin projects and the PRM.</p> <ul style="list-style-type: none"> • To foster a common agenda among akin networks. • To facilitate and systematize information exchange. • To reinforce NARS collaboration with public and private organizations for technology transfer. <p>To support NARS in their collaboration with seed industries.</p>	<p>IR 5.1: Beginning in 1995, a common agenda is available between the PRM and some akin projects, at least within those also financed by SDC (PROFRIJOL, CIAT-Laderas, PASOLAC) and inclusion in the annual operating plans (POA's).</p> <p>IR 5.2. Up to 1998, bilateral arrangements have been negotiated between the PRM and at least three NGO's active in validation and extension in rural areas.</p> <p>IR 5.3. Up to 1998, at least two workshops have been done on seed marketing, sales policy and intellectual property rights.</p> <p>IR 5.4 Up to 1996, at least one project is secured with PRIAG.</p>	

Descriptive Summary	Objectively Verifiable Indicators	Important Suppositions
<p>R6. PRM internal bodies function properly, and the technical and administrative activities are executed efficiently and effectively.</p>	<p>IR 6.1. Up to 1995, the CRP has revised and approved the internal structure and statutes of the PRM. IR 6.2. Up to 1996, the Technical Committee participates in the monitoring and follow-up of planned activities. IR 6.3. Up to 1998, >80% of programmed activities are executed. IR 6.4. Beginning in 1995, the POA is published within a month after the planning meeting. IR 6.5. Beginning in 1995, the CRP has funds available to function.</p>	
<p>Activities: A 1.1: To generate cultivars thru intra and inter-population selection. A 1.2: To generate cultivars thru hybridization. A 1.3: To evaluate generated cultivars. A 1.4: To maintain and conserve germplasm. A 1.5: To conduct studies of genetic gain. A 2.1: To evaluate elite germplasm under different agronomic practices. A 2.2: To generate genetic coefficients for maize. A 2.3: To evaluate legume species that adapt well to intercropping with maize. A 2.4: To evaluate edible legume species for intercropping with maize. A 2.5: To generate management recommendations for legume species in maize production systems. A 2.6: To evaluate different sources of crop residues for use as mulch. A 2.7: To identify simple methodologies to estimate nutrient fluxes. A 2.8: To determine water and N fluxes in maize production systems. A 2.9: To register the minimum dataset required for use in crop simulation modeling A 2.10: To characterize sources and types of fertilizers. A 2.11: To generate recommendations for maize production systems. A 2.12: To validate promising technical alternatives. A 2.13 : To realize agro-socioeconomic diagnostics in maize production systems. A 2.14: To realize workshops on simulation modeling. A 2.15: To identify the physical and economic factors which limit the adoption of technologies in maize production systems. A 3.1. To realize agro-socioeconomic diagnostics in maize production systems.</p>		<p>S 1.1. Outside financial and technical support is maintained. S 1.2. The NARS continue to function. S 1.3. There is availability of germplasm. S 1.4. There is infrastructure within NARS for germplasm conservation. S 2.1. There are no natural disasters or calamities. S 2.2 The process of regional integration and stabilization maintains its present course. S 2.4. Disbursement of funds is timely. S 2.5. CIAT-Hillsides provides access to databases and the methodology for estimation of nutrient fluxes. S 3.5. Akin networks and projects do have interest in collaborating with the PRM. S 3.6. CIMMYT provides efficient and adequate technical support. S 4.2 There are postgraduate training opportunities. S 5.5. The planning rhythms of different projects do permit the development of common plans. S 5.7. There is a will among donors to coordinate their support and their activities. S 5.8. Private seed companies do find interest in PRM's germplasm.</p>

Descriptive Summary	Objectively Verifiable Indicators	Important Suppositions
<p>A 3.2. To develop methodologies for identification of limiting factors in maize production systems.</p> <p>A 3.3. To evaluate economically long-term experiments.</p> <p>A 3.4. To develop case studies and conduct workshops for feedback.</p> <p>A 3.5. To conduct ex-post economic analysis thru adoption and impact studies.</p> <p>A 3.6. To identify the role of the public and private sector in seed production and distribution.</p> <p>A 4.1. To coordinate with other bodies the regional needs of training.</p> <p>A 4.2. To develop pertinent training materials.</p> <p>A 4.3. To offer and participate training at the national and regional level in collaboration with others.</p> <p>A 4.4. To search outside financing for formal training.</p> <p>A 5.1. To consult with the PCCMCA and CIAT regarding organization of the first forum (1995-1998).</p> <p>A 5.2. To participate in a yearly meeting to develop a common agenda.</p> <p>A 5.3. To classify information of common interest</p> <p>A 5.4. To execute activities of PRM responsibility.</p> <p>A 5.5. To plan joint activities (research, methods, places, workshops, field guides, etc.).</p> <p>A 5.6. To fine-tune restitution of results according to user needs.</p> <p>A 5.7. To provide assistance to NARS in planning workshops and evaluation with extension bodies.</p> <p>A 5.8. To conduct workshops on seed marketing, sales policies and intellectual property.</p> <p>A 6.1. To search outside funding for training.</p> <p>A 6.2. To follow-up activities planned in POA's</p> <p>A 6.3. To follow-up the functions described in the internal statutes of the PRM.</p> <p>A 6.4. To edit and publish the POA and Gray Book.</p>		

