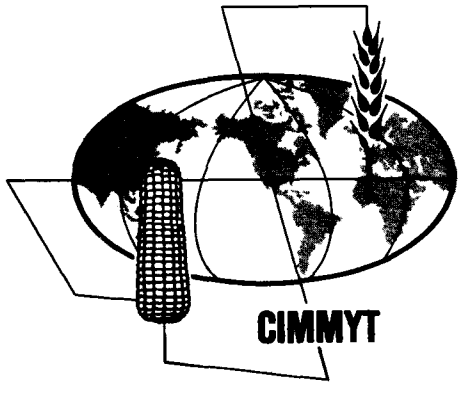
Information Bulletin No. 8

March, 1973

WHAT IS CIMMYT

CENTRO INTERNACIONAL DE MEJORAMIENTO DE MAIZ Y TRIGO
INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER
Londres 40 Apartado Postal 6-641 México 6, D. F., México



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Compiled by: Robert D. Osler

CONTENTS:

These maps, charts, and statements have been prepared to give a brief picture of CIMMYT to the increasing number of visitors to CIMMYT Headquarters.

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NETWORK OF INTERNATIONAL AGRICULTURAL CENTERS

Starting in 1960, a network of international centers was established for agricultural research, training, and outreach assistance to governments.
In 1973, six centers are operating.
These six centers are listed below, and are located (by the same numbering) on the map below:

Key	Center	Year	Crop or Research Emphasis
1.	**IRRI** (International Rice Research Institute) Los Baños, Philippines.	1960	Rice and farming systems for rice.
2.	**CIMMYT** (International Maize and Wheat Improvement Center) Mexico.	1966	Maize, wheat, barley, rye, triticale
3.	**IITA** (International Institute for Tropical Agriculture) Ibadan, Nigeria	1967	Farming systems for lowland humid tropics including work on maize, rice, tubers, food legumes.
4.	**CIAT** (International Center for Tropical Agriculture) Cali, Colombia	1968	Farming systems for the tropics with emphasis on beef, swine, cassava, maize, rice and beans.
5.	**IPC** (International Potato Center) Peru	1972	Potatoes
6.	**ICRISAT** (International Crop Research Institute for the Semi-Arid Tropics) India	1972	Sorghum-millets, food legumes and farming systems for semi-arid tropics.

Chart 2

WHAT IS CIMMYT? A SUMMARY

I What is CIMMYT?

CIMMYT is a private, autonomous, nonprofit, scientific and educational institution chartered under Mexican law to engage in the improvement of maize and wheat production, everywhere in the world, with emphasis on developing countries.

II CIMMYT Financing

In 1972, CIMMYT spent approximately $6.8 millions on its "core program" in Mexico, on its capital plant in Mexico and on special projects. These funds come under three budgets:

"Core program" in Mexico	$3.3 millions
Special projects, both in Mexico and abroad	2.5 millions
Capital Budget	1.0 millions
	$6.8 millions

III Donors to CIMMYT

CIMMYT receives funds from eight donors in 1973.

World Bank (IBRD)
United Nations Development Programme (UNDP)
Inter-American Development Bank (BID)
Government of Canada (CIDA)
Government of U.S.A. (USAID)
Ford Foundation (FF)
Rockefeller Foundation (RF)
Government of West Germany

IV CIMMYT Staff

At the time these charts were prepared, CIMMYT employed 38 senior scientists and administrators at its headquarters in Mexico. They involved 9 different nationalities:

Mexico	14
U.S.A.	10
United Kingdom	3
Australia	2
Canada	2
Chile	2
Costa Rica	2
India	2
Bolivia	1
	38

In addition CIMMYT has assigned 20 scientists full time to work on research and production projects outside Mexico.

More staff details are given in Charts 8, 11, 13, and 14.

V Research Stations

CIMMYT uses six research stations in Mexico, ranging in elevation from near sea level to 8,700 feet. Details are in Chart 5.

VI CIMMYT Board of Trustees 1973

CIMMYT is governed by an autonomous Board of Trustees, composed in February 1973 of thee following:

Manuel Bernardo Aguirre (Mexico)
Secretary of Agriculture and Animal Husbandry, Federal Government of Mexico. President of the CIMMYT Asamblea.

Virgilio Barco (Colombia)
Executive Director of World Bank, representing Brazil, Colombia, Dominican Republic, Ecuador and the Philippines. Chairman of the CIMMYT Board of Trustees.

Sterling Wortman (USA)
Vice president, The Rockefeller Foundation. New York. Vice Chairman, Board of Trustees.

Oscar Brauer (Mexico)
Under Secretary of Agriculture, Federal Government of Mexico.

Francisco Cárdenas R. (Mexico)
Director, National Institute of Agricultural Research, Federal Government of Mexico.

Guy Camus (France)
Directeur, Organization della Recherche Scientifique et Technique Outre-Mor (ORSTOM), Government of France, Paris.

Luis Fernando Cirne Lima (Brazil)
Minister of Agriculture, Federal Government of Brazil, Brasilia, Brazil.

José D. Drilon, Jr. (The Philippines)
Under Secretary of Agriculture, The Republic of the Philippines and Director, Southeast Asian Regional Center of Agriculture, Los Baños, Philippines.

Lowell S. Hardin (USA)
Agricultural Program Adivsor, The Ford Foundation, New York.

Leonel Robles Gutiérrez (Mexico)
Director, Div. of Agricultural and Maritime Science, Monterrey Institute of Technology, Monterrey, Mexico.

M. S. Swaminathan (India)
Director, Indian Council of Agricultural Research, New Delhi, India.

Kamal Ramsy Stino (Egypt)
Chairman, Arab Organization for Agricultural Development, Khartoum, Sudan.

Haldore Hanson (USA)
Director General, CIMMYT.

Revised February,

MAP OF MEXICO CITY AND ENVIRONS, SHOWING LOCATION OF CIMMYT RESEARCH SITES AND OTHER POINTS OF INTEREST

1) **Mexico City.** Population 7.5 millions. CIMMYT downtown office at 40 Londres Street.

2) **CIMMYT Headquarters,** at El Batán, 45 kilometers northeast of city.

3) **Pyramids of Teotihuacan,** probably most famous in Western Hemisphere, built about 900 A.D. Located 20 km from CIMMYT Headquarters.

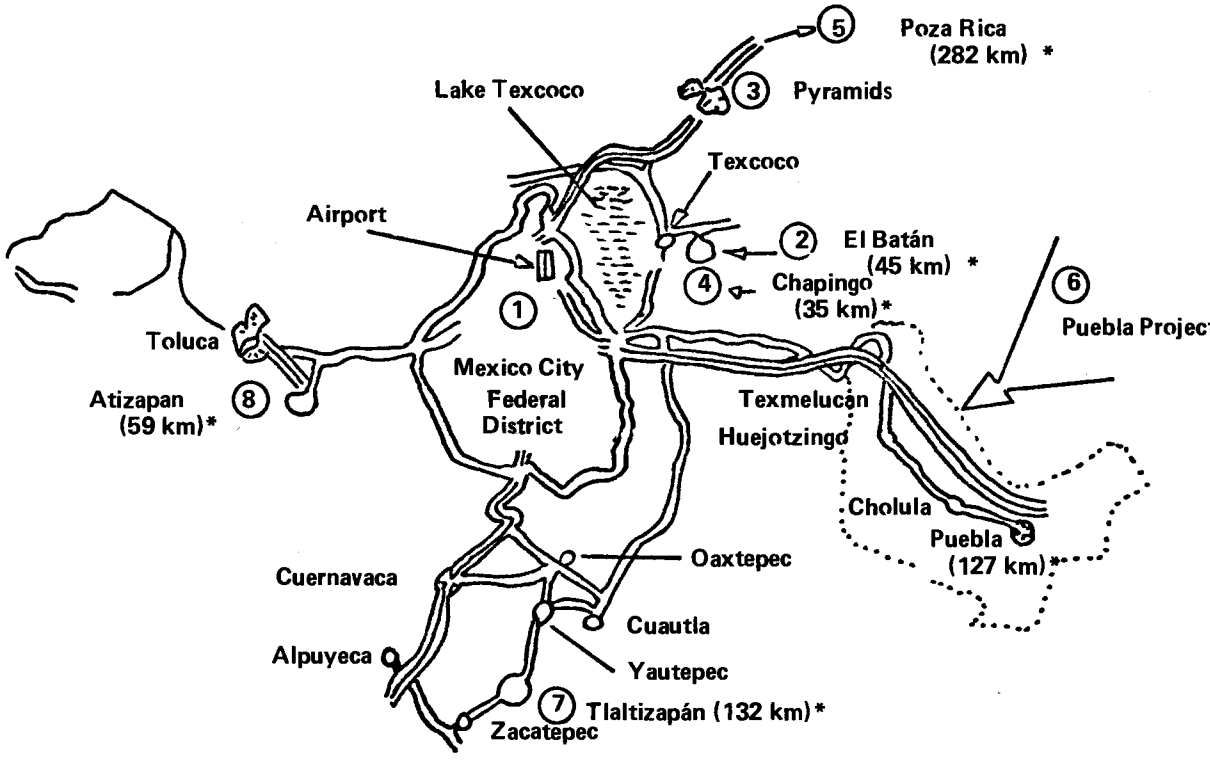
4) **Chapingo,** headquarters of Mexico's National Agricultural Research and Extension Service, National School of Agriculture and Post Graduate College. 8 km from CIMMYT Headquarters.

5) **Poza Rica,** site of CIMMYT's principal low altitude maize research station, 282 km northeast of Mexico City.

6) **Puebla Project,** area of 47,000 families where CIMMYT has worked with a small farmer maize production project, 1967-73. 100 km east of Mexico City.

7) **Tlaltizapan,** CIMMYT's intermediate altitude maize research station, 130 km south of Mexico City, near Cuernavaca.

8) **Atizapan,** CIMMYT's highest altitude wheat and maize station, 2640 meters, 60 km west of Mexico City, near Toluca.



* Distance from Mexico City

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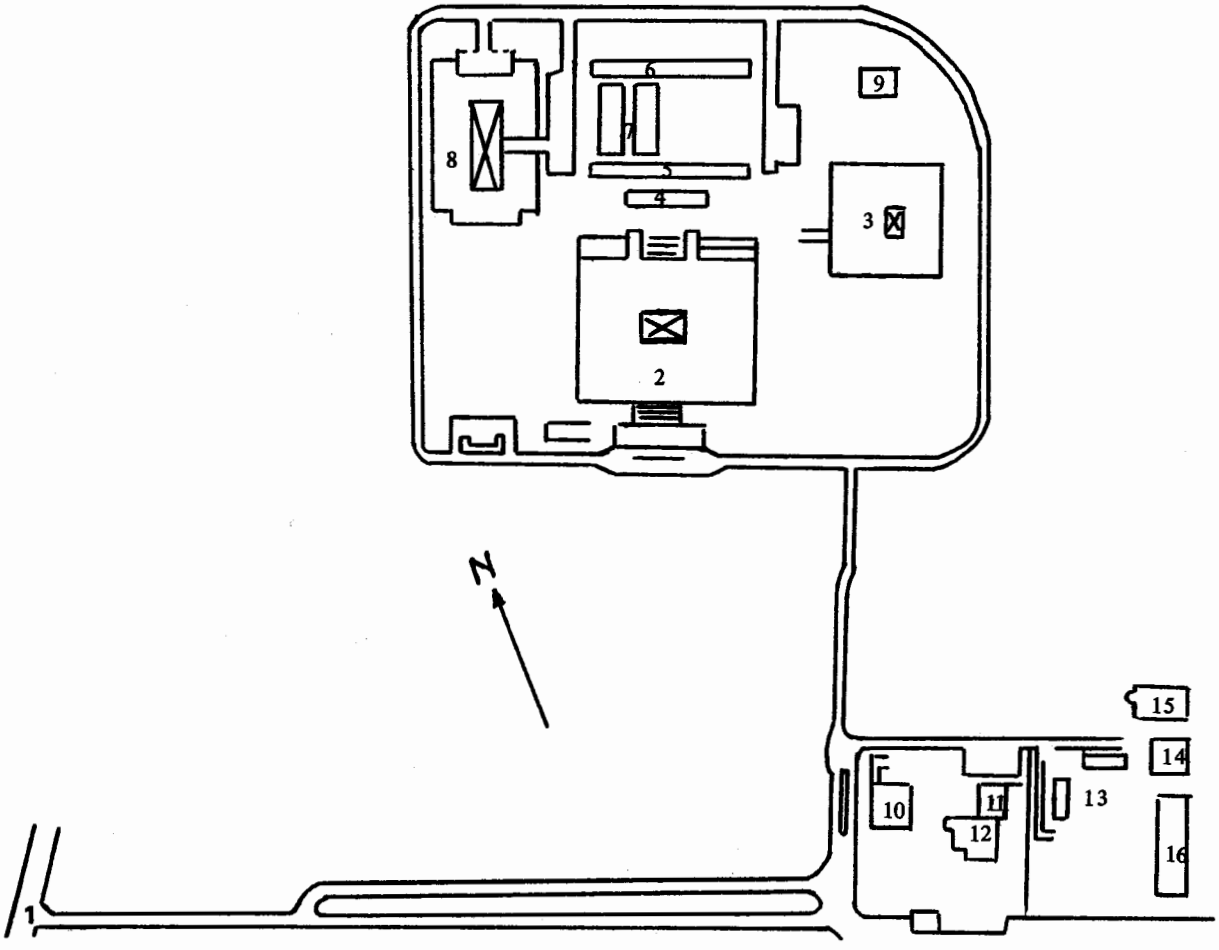
Chart 4

MAP OF CIMMYT HEADQUARTERS, EL BATAN

CIMMYT headquarters buildings were built mainly during 1969-71 on 43 hectares of land contributed by the Government of Mexico. An additional 22 hectares were purchased in 1972. The Headquarters was formally inaugurated in September 1971.

1. Highway Mexico City-Veracruz (km post 45)
2. General Administration and Office Building.
3. Laboratory Building containing Cytogenetics, Protein Quality, Milling and Baking, Soils and Plant Nutrition, Entomology and Plant Pathology Laboratories.
4. Power House
5. Animal Nutrition and Physiology/Agronomy Laboratories.
6. Service Building for greenhouse and Entomology Laboratory.
7. Greenhouses.
8. Experimental Seed Processing and Storage including cold storage rooms for maize and wheat germ plasm
9. Meteorological Station.
10. Dormitories accommodating 60 trainees and guests.
11. Cafeteria for staff and trainees.
12. Guest House with 6 bedrooms.
13. Ten Apartment Houses for scientists on short term postdoctoral grants or other trainees with families.
14. Auto and Tractor Machine Shop.
15. Warehouse.
16. Irrigation reservoir.



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MAP OF EXPERIMENT STATIONS WHERE CIMMYT WORKS IN MEXICO

CIMMYT works on 6 experiment stations in Mexico, four of which are CIMMYT operated and two are controlled by INIA. (The Mexican National Institute of Agricultural Research). These stations range in elevation from sea level to 2,640 meters (8,661 feet). Because of the wide range in temperature, moisture, and radiation on these stations, CIMMYT is able to simulate the major conditions of climate, disease, and insects that exist in the maize and wheat growing areas of the world in which CIMMYT is concentrating its major efforts.

Name of Station &	Distance from Closest City	Distance from Mexico City	Alt.	Long.	Lat.	Ha of Exp. Land used by CIMMYT by crop	Crop Season
1 CIANO-INIA	8 km from Cd. Obregón	1,800 km	39 m 128 ft	109°55′ West	27°29′ North	80 Wheat 5 Maize	Nov-May Jun-Dec
2 Río Bravo-INIA	10 km from Río Bravo	1,600 km	30 m 98 ft	98°10′ West	26° North	5 Maize	Feb-July
3 Poza Rica-CIMMYT	10 km from Poza Rica	282 km	60 m 197 ft	97°31′ West	20°29′ North	45 (Maize planted twice a year)	Dec-May Jun-Nov
4 EL Batán-CIMMYT	4 km from Texcoco	47 km	2,249 m 7,379 ft	98°50′ West	19°31′ North	26 Maize 17 Wheat 2 Sorghum	Apr-Dec Year around Jun-Dec
5 Toluca-CIMMYT	27 km from Toluca	85 km	2,640 m 8,661 ft	99°51′ West	19°16′ North	44 Wheat 10 Maize 5 Potatoes	Year around Apr-Dec Mar-Dec
6 Tlaltizapán-CIMMYT	47 km from Cuernavaca	132 km	940 m 3,084 ft	99°08′ West	18°41′ North	30 (Maize planted twice a year)	Dec-May Jun-Nov

Chart 6/1

CIMMYT'S MAIZE PROGRAM

The objectives are:

(I) To assist in the development of national and regional maize improvement programs, and to supply technology for those programs which will benefit the largest possible numbers of farmers, especially in developing countries.

(II) To increase the efficiency of maize yields, as measured by yield per land unit, and by production costs per measure of grain.

(III) To improve the nutritional quality of maize, especially in protein quantity and quality.

Importance of maize in the world

The world maize crop is generally considered to be the third most important cereal after rice and wheat from the standpoint of average total annual production.

Approximately 60% of the total annual world production measured by crop weight it grown in temperate climate countries in the northern hemisphere. Most of this grain is used for animal feeds.

Although CIMMYT cooperates with scientists and national programs of temperate climate countries, most of CIMMYT's efforts are concentrated in the newly developing countries of the world. This involves the majority of the world maize area measured by cropping hectares and, in general, the area where the yields are lowest. This area of the world also includes the bulk of the population which uses maize directly as a human food and thus would stand to benefit most from the efforts CIMMYT and its collaborators are making to improve the protein quality of maize.

Some basic elements of CIMMYT's Maize Program

Assistance to national research and production programs:

CIMMYT's primary objective involves strengthening national research and production programs, through provision of superior varieties, training of national staff, and working with national governments on the planning strategy, to reach their targets of production and staff development to the point that they can become self sufficient in their research and production needs.

Maize improvement through regional groupings of countries:

In five areas of the world, maize growing countries have joined in voluntary cooperative groups for maize improvement and these regional groups of nations become the sponsors in their respective areas of regional maize trials, regional maize workshops, etc. These are:

Region	No of Countries	Regional Headquarters	Financing for Technical Assistance
1. Central American Maize Program	6	CIMMYT, Mexico	CIMMYT
2. Andean Maize Program	5	CIAT, Colombia	CIAT
3. West Africa Tropical Maize Program	4	IITA, Nigeria	IITA
4. East Africa Tropical Maize Program	4	Kitale, Kenya	East Africa Community & USAID
5. Inter-Asian Corn Program	12	Bangkok, Thailand	Rockefeller Foundation

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International trials:

Newly formed populations and progeny coming out of the CIMMYT research program in Mexico are tested in at least six locations in Mexico and up to 100 locations outside Mexico. The CIMMYT plant protection staff inoculate these materials with different pathogens and artificially infest these same entries with major pests. The physiologists are determining the appropriate management practices for maximum production. The trainees at CIMMYT receive field experience in all of the above activities. National production programs are learning to select economic packages of cultural practices that fit the local cropping sequence and economy..

In addition to wide testing of such materials, a relatively large international testing program is under way in which CIMMYT and other contributors from around the world include materials in uniform trials that are conducted in many countries (401 trials in 52 countries in 1972). CIMMYT also has a uniform trial of its own material that is tested every year in the major environments of the world where maize is grown. The entries in these trials are changed when new and better materials become available.

Workshops:

CIMMYT participates in all the regional workshops organized by the regional maize programs such as in the Anden region sponsored by CIAT. Papers and discussions revolve around materials and approaches to research and production. The international testing program provides a common basis for discussion.

Bringing people together on a regional basis and occasionally on a global basis stimulates exchange of material and ideas. In fact, it brings the world maize research and production people into a common fraternity with a common interest.

Regional training programs assist each region to strengthen research and production.

CIMMYT sponsors an annual field workshop involving its resident staff in Mexico and its international staff posted outside Mexico. This has been an effective way of keeping all staff up to date on new materials and approaches and assures that they are working cooperatively towards will defined objectives. The 1972 workshop was held in September in the Arab Republic of Egypt.

Germ Plasm Bank:

CIMMYT operates the largest maize germ plasm bank in the world. This facility now stores under refrigerated and humidity controlled conditions some 12,000 accessions from 47 countries.

New Varieties:

CIMMYT neither names nor releases new varieties. Release is a responsibility of the cooperating Governments, and each Government chooses its releases under local conditions.

Chart 7/1

CIMMYT'S WHEAT PROGRAM

The objectives are:

(I) To assist in the development of food grain improvement programs, and to supply materials and technology for those programs which will benefit the largest possible number of farmers, especially in developing countries.

(II) To increase the efficiency of grain yields, and stability of yields, as measured by yield per land unit, and by lowered production costs per measure of grain in order to help the grower achieve a greater net income, and to ensure an adequate food supply available at economical prices to the entire population of wheat growing countries.

(III) To improve the nutritional quality of food grain, especially in protein quantity and quality.

Cereal grains being studied, and world areas which are expected to benefit.

A list of small grains under study at CIMMYT shows:

Spring bread wheats
Winter bread wheats
Durum wheats
Barley
Triticale

It is estimated that wheat provides 20% of the total world food calories, second only to rice at 21% and that wheat constitutes the main food staple in the diet of 35% of the world population.

Spring bread wheat is the major type of wheat grown in Mexico, India, Pakistan, Egypt, the USSR, Canada, and Australia. Important areas are also grown in Turkey, Morocco, Algeria, Tunisia, Syria, Afghanistan, Guatemala, countries in the northern half of the Andean zone of South America, and U.S.A.

Winter bread wheat is the single most important food crop in the highlands of Turkey, Iran and Afghanistan, and is the predominant type of wheat in parts of two South American countries, Argentina and Chile. Winter wheats also are predominant in Europe, Japan and the U.S.A.

Durum wheat provides the world's macaroni, spaghetti, other pastas and such special preparations as couscous and semolina. Durums are an important wheat crop in several countries surrounding the Mediterranean, and there is important production of durums in Argentina, Chile, the U.S.A., and Canada.

Barley in both hull-less and hulled form, is a human food in the semi-arid countries of North Africa and the Near East, stretching from Morocco in the west to Iran in the east and in Peru and Bolivia. It is also used for human food in Finland. This is one of man's most dependable cereals in areas of very low rainfall. Before creation of CIMMYT in 1966, Rockefeller Foundation staff in Mexico worked on barley during the years 1952-1962. CIMMYT resumed barley research in 1972, principally to serve those areas of low rainfall adjacent to deserts or at high altitude where wheat is only marginally successful.

Triticale is a "man-made" wide cross (a cross between two different genera, wheat, and rye). Like the mule, which is also a wide cross, triticale was originally sterile, but its fertility has been restored by plant breeders. Despite plant defects which remain, it is hoped that before the end of the 1970's triticale will provide a higher yield per land unit and better protein quality, than either its wheat or rye parents under some ecological conditions.

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CIMMYT's priorities in the small grain programs have been shaped by the needs of the governments which CIMMYT and its predecessors have assisted: first an emphasis on spring bread wheats in Mexico; next the spring bread wheats of India and Pakistan; then programs on North Africa and the Near East, involving spring bread wheats and durums; next assistance in Turkey, Iran and Afghanistan, requiring winter bread wheats, and then a return to barley on behalf of the semi-arid Near East areas.

CIMMYT has also tried to develop new cereals for the future by its work on wheat and triticale.

Some basic elements in CIMMYT's wheat program:

(1) Germ plasm bank: CIMMYT maintains no complete world seed collection on wheat (over 26,000 items), but only a smaller working collection. The U. S. Department of Agriculture is CIMMYT's chief source whenever CIMMYT finds it desirable to rescreen the world collection for particular economic characteristics.

(2) Continuous crossing: Every year since 1954, CIMMYT and its predecessor agencies have made numerous crosses within a working wheat collection in Mexico. The breeding program is massive and continuous. In the year 1972, about 5,500 crosses were made in bread wheat. From past experience at least 40% of these crosses will be discarded after the first generation, and at each further generation from F2 through F7, more will be discarded, until by generation F7, less than 1% of the crosses will survive the rigorous screening.

(3) Two generations are grown per year of all experimental lines of small grain at CIMMYT, generally a winter generation at near sea level at Ciudad Obregon, and a summer generation near Toluca at elevation of 2,640 meters (8,700 feet).

(4) Optimum production environment: All CIMMYT experimental sites in Mexico are being land levelled, equipped with supplemental irrigation facilities, and are cultivated mechanically. The purpose is to eliminate, insofar as possible, variations in seedbed and moisture, and thus to permit each experimental seed line to express its full production potential. This does not mean that CIMMYT is trying to benefit the irrigated, mechanized farmer, but only that CIMMYT provides a dependable first step for breeding and experiments.

(5) Worldwide selection: CIMMYT's experimental materials aredistributed,from generation F2 onward, to a network of approximately 500 cooperating scientists in over 60 countries. Plant performance is observed for up to six generations under wide variations in growing conditions: some irrigated, some dryland, some fertilized, some unfertilized,some machine operate, some hand cultivated. This testing is conducted in competition with local wheats and other small grains.

(6) International data: Data from the testing process in item (5) is sent back to CIMMYT, and after analysis a summary report is issued to the network of scientists around the world, to help guide their research.

(7) New varieties: CIMMYT neither names nor releases new varieties. Release is a responsibility of the cooperating governments, and each government chooses its releases for its local conditions. A country which produces rainfed wheat selects new varieties which do best under rainfed conditions.

(8) Exotic germ plasm: Whenever cooperating scientists in countries outside Mexico develop promising local breeding materials, are measured against CIMMYT materials, these exotic materials are brought to CIMMYT and added to the headquarters breeding gene pool

(9) Diseases and insects: Because CIMMYT's breeding materials are grown in a large number of countries under different environments, the need for a broad spectrum of disease resistance is evident. New sources of resistance to major diseases are continuously incorporated into the gene pool and selections made in other countries are recycled through the system of crosses. Observations on insect attack are also made within the various national programs and on a regional basis.

The above research process is unique in the range of wheat germ plasm employed, and in the world-wide network of collaborating scientists.

Chart 8

CIMMYT STAFF: 1966 - 73

CIMMYT Staff has grown as its international responsibilities increased. CIMMYT's senior scientists and administrators in Mexico consisted of only 8 men in 1966, all assigned by Rockefeller Foundation. In 1973 there are 51 senior staff positions in Mexico and 20 resident professional staff on projects outside Mexico.

Supporting staff in Mexico (clerical, accounting, administrative services, laboratory technicians) have risen in six years from 25 to 278.

As research stations have increased the labor force employed in research has risen from 8 to 71 during 1966-73.

CIMMYT's headquarters staff is now considered near its maximum size, but staff outside Mexico may undergo further growth.

Table 1.

AUTHORIZED STAFF POSITIONS

Category	1966	1967	1968	1969	1970	1971	1972	1973
Professional staff in Mexico	8	18	24	27	28	39	46	51
Professional staff abroad	1	2	8	12	10	18	23	20
Supporting staff in Mexico	25	66	89	171	184	226	255	278
Field labor force in Mexico	8	17	25	40	45	48	58	71
Total positions:	42	103	146	250	267	331	382	420

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CIMMYT OUTREACH: INTERNATIONAL NURSERY TRIALS, 1972

CIMMYT began in 1960 to distribute "international nursery trials" involving experimental lines of wheat. Similar trials of maize where initiated in 1971.

An "international nursery trial" consists of identical selection of experimental lines or populations sent to a large number of cooperating scientists throughout the world, who grow the seeds under specified conditions in comparison with recommended local varieties.

Their results are reported back to Mexico, where the data are analyzed, published, and re-distributed to cooperating scientists and others who are interested.

The objectives are: (1) to test new lines of wheat and maize under widely differing conditions of moisture, temperature, daylength, disease, and insects; (2) to obtain data which guides the CIMMYT breeding programs; (3) to train a network of cooperating scientists; and (4) to obtain from these scientists their best experimental germ plasm for inclusion in future trials and in CIMMYT's wheat crossing programs.

The system has grown phenomenally, In 1972 there were 1038 separate trials in 85 countries.

Region	No. of Countries		No. of Trials	
	Wheat	Maize	Wheat	Maize
Latin America	11	18	215	277
Asia and Pacific	12	11	87	48
N. Africa and Near East	12	10	151	14
Africa South of the Sahara	9	11	39	50
Europe, Canada, U.S.A.	18	2	145	12
Totals	62 1/	52 1/	637	401

1/ involving 85 different countries

Chart 9/2

CIMMYT OUTREACH: INTERNATIONAL NURSERY TRIALS, 1972

By Countries

Region & Country	No. of Trials	
	Wheat	Maize
Latin America (totals)	**215**	**277**
Argentina	46	4
Bolivia	2	2
Brazil	35	4
Chile	20	4
Colombia	10	47
Costa Rica		17
Dominican Republic		8
El Salvador		20
Ecuador	8	7
Guatemala	7	18
Guayana		2
Honduras		35
Jamaica		6
Mexico	63	25
Nicaragua		35
Panama		21
Paraguay	6	
Peru	14	7
Uruguay	4	
Venezuela		15
Asia & Pacific (totals)	**87**	**48**
Afghanistan	6	1
Australia	2	1
Bangladesh	1	
Ceylon		2
China	1	
India	30	11
Indonesia		2
Iran	10	4
Japan	1	
Nepal	6	4
New Zealand	3	1
Pakistan	21	5
Philippines		4
South Korea	5	
Thailand	1	13
N. Africa & Near East (totals)	**151**	**14**
Algeria	24	
Cyprus	1	1
Iraq	10	1
Israel	10	
Jordan	7	1
Lebanon	18	
Libya	5	1
Morocco	6	
Saudi Arabia		2
Sudan	1	
Syria		2
Tunisia	24	1
Turkey	35	1
U.A.R. (Egypt)	10	3
Yemen		1

Region & Country	No. of Trials	
	Wheat	Maize
Africa south of the Sahara	**39**	**50**
Camaroon	1	
Ethiopia	17	2
Ghana		2
Ivory Coast		4
Kenya	8	5
Lesotho	1	
Malawi		2
Nigeria		17
Senegal	1	
Somalia		2
Southern Africa (region)	8	5
Tanzania	3	9
Uganda		2
Canada, Europe, Oceania, USA. (totals)	**145**	**12**
Bulgaria	1	
Canada	13	1
Denmark	2	
England	3	
France	2	
Greece	1	
Hungary	2	
Italy	1	
Poland	4	
Portugal	6	
Romania	4	
Russia	8	
Spain	5	
Sweden	5	
Switzerland	2	
U.S.A.	82	11
West Germany	1	
Yugoslavia	3	

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CIMMYT OUTREACH: TRAINING AT CIMMYT 1966 - 72

CIMMYT receives fellows in six categories:

1. In-service trainees: Young researchers and extension personnel from developing countries, generally in age range 22-30, with previous experience in government agricultural programs, spend 6-18 months in Mexico participating directly in research or production methods.
2. Research assistants: After one to two years applied training at CIMMYT, candidate is sometimes awarded a fellowship for Masters degree study usually in Mexico.
3. Predoctoral fellowships: Graduate students who have completed course work and preliminary examination of Ph. D. may perform thesis research under CIMMYT supervision.
4. Postdoctoral fellowships: A scientist who recently completed his terminal degree may spend one to two years at CIMMYT in applied research. Most candidates are from Asia, Africa, or Latin America, but some come also from U.S.A., preparing for careers in international agriculture.
5. Visiting senior scientists: While on leave from his post, a senior scientist may spend 4-12 months at CIMMYT, engaged in joint research with CIMMYT staff. Candidates may come from either developing or advanced countries.
6. Short-term residents: Policy making officials from developing countries may spend periods of one week to several months observing CIMMYT research and production methods.

Table 1.

CIMMYT Trainees, 1966-72. (Individuals per year)

Category	1966	1967	1968	1969	1970	1971	1972	Total
In-service	12	29	27	48	42	67	82	307
Research Assistant	5	6	10	4	11	20	14	70
Predoctoral		1	2		2	2	1	8
Postdoctoral		3	7	8	9	6	3	36
Visiting senior scientists 1/			2	2	4	4	6	18
Short-term residents 1/	5	5	10	10	15	20	25	90
Totals	22	44	58	72	83	119	131	529

1/ Estimated. No accounting before 1972.

Table 2.

Countries of In-service Trainee nationality by regions, 1966-72

Region	No. of countries
Latin America	17
Asia & Pacific	8
North Africa & Near East	16
Africa south of the Sahara	7
Europe and U.S.A.	2
Totals	50

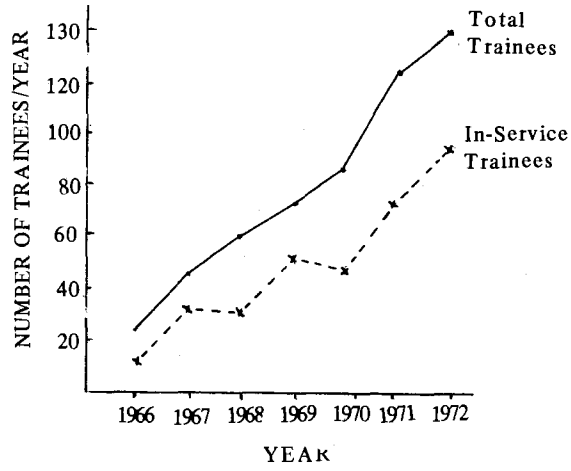


Chart 11

CIMMYT OUTREACH: PROJECTS OUTSIDE MEXICO WITH CIMMYT RESIDENT STAFF

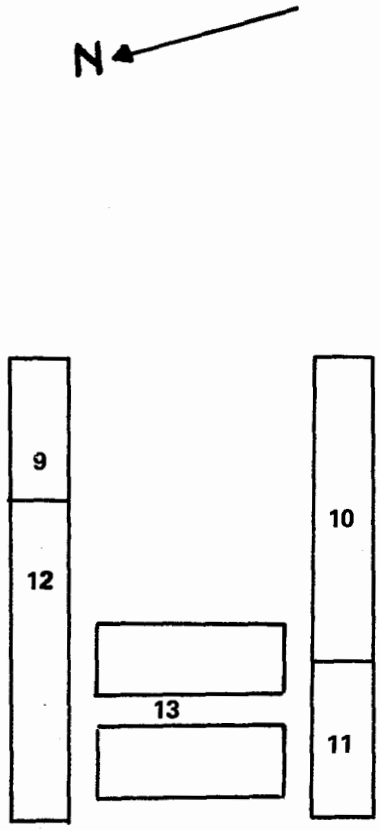
Resident CIMMYT staff are stationed in countries outside Mexico when a Government asks for them and a special grant to CIMMYT covers the cost. These special projects and the number of staff by country in 1973 are:

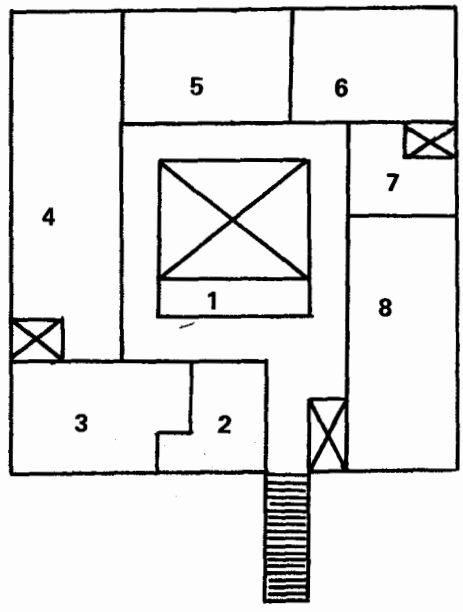
Country and year started	Number CIMMYT Staff	Donor
Colombia (1971)	1	UNDP
Morocco (1968)	2	USAID
Algeria (1971)	4	Ford Foundation
Tunisia (1968)	4	Ford Foundation and USAID
Zaire (1971)	3	Govt. of Zaire
U.A.R. (1968)	1	Ford Foundation
Turkey (1970)	2	Rockefeller Foundation
Nepal (1972)	1	USAID
Pakistan (1965)	2	Ford Foundation
	20	

Services to other countries including most of Latin America are provided by CIMMYT Headquarters staff travelling from Mexico.

Revised February, 1973

LABORATORIES AT CIMMYT HEADQUARTERS





1. Offices
2. Cytology
3. Protein Quality
4. Milling and Baking
5. Entomology: Insect Mass-rearing
6. Soils and Plant Nutrition
7. Entomology:Stored-grain insect studies
8. Pathology
9. Entomology: Insect Mass-rearing
10. Physiology/Agronomy
11. Animal Nutrition (Meadow Vole)
12. Greenhouse Work Area
13. Two greenhouses

Chart 12/2

1. Offices for Professional Staff.

2. Cytology Laboratory. The main purpose of this laboratory has been to study chromosome morphology, specifically, the chromosome knob constitutions of different collections of maize of the Americas as means of learning more about the origin, evolution and migration, not only of the maize plant in general, but also of the different races of maize. It also provides space for Embryo culture work, primarily in Triticale.

3. Protein Quality Laboratory. The purpose of this laboratory is chemical evaluation of genetic materials as an aid to CIMMYT's breeding programs. Using simple screening techniques, the chemical evaluation is annually performed on thousands of samples of maize, wheat and triticale.
   The laboratory allows selection of materials with high protein content, better amino acid balance and potentially, therefore, better nutritional value.

4. Milling and Baking Laboratory. This laboratory is an aid to the plant breeders in catering of the varied tastes of people as well as industrial uses in their development of new wheat varieties.
   A microtest analyzes seed from thousands of plants selected by the breeders in early generations. Only the best material is retained for planting in the next cycle.
   For advanced generations, analysis includes milling, physical and chemical tests, baking and spaghetti processing.

5. Insect Mass-Rearing Laboratory. This laboratory includes four temperature and humidity controlled chambers for egg incubation and larval development. It also includes a diet preparation room, a diet dispensing room, and a surface decontamination area.

6. Soils and Plant Nutrition. This laboratory provides information on the characteristics and fertility of the soils used in experiments, allowing correction of possible deficiencies and the evaluation of the chemical and physiological factors involved in the metabolism of the plants, as an aid to the selection of lines with increased production of protein, starch and/or yield of grain.

7. Stored-Grain Insect Laboratory. This laboratory consists of two rooms and two temperature and humidity controlledchambers.This area provides facilities for microscopic examination and weight determinations of insects and grain samples, and for preparing, conditioning and infesting the materials to be tested.
   The two chambers permit CIMMYT to maintain insect colonies of eight cosmopolitan species, and to investigate chemical grain protectants.

8. Pathology Laboratory. The main purpose of this laboratory is to produce culture media for mass production of maize and wheat pathogens, and the evaluation of new techniques of mass inoculation which are necessary for the selection of more resistant or tolerant genotypes of maize and wheat.

9. Insect Mass-Rearing Workroom. This area is used for storing and processing diet ingredients, for field infestation at Poza Rica and Tlaltizapan.

10. Physiology/Agronomy Laboratory. There are three main parts to the laboratory: a large rough work laboratory, a microscope and seed lab, and an instrument room and workshop.
    Rough-Work Room. For studies of the growth and yield of crops relatively bulky samples of plant material are collected from the field trials. This laboratory provides the washing, weighing, and drying facilities needed to handle such samples.

    The Microscope and Seed Room. Provides space which is relatively free from the dust and dirt brought in with field samples. It is used for dissection and microscope work and for handling experimental seed samples.

    The Instrument Room. This involves a small workshop for the repair and service of instruments used at El Batán and at other experiment stations. Part of the area is designated for controlled environment cabinets which will be installed in the future.

11. Animal Nutrition Laboratory. The grain samples selected in the protein quality laboratory through chemical test must be checked by feeding to animals to determinate their actual biological value.
    This laboratory uses the meadow vole as a test animal due to its rapid growth and reproduction rate.
    Approximately 800 animals are now in this laboratory, either on feeding trials, or for breeding purposes.

12. Greenhouse Work Area. Potting area, soil preparation, rust inoculation facilities and for general greenhouse activities

13. Greenhouses. Principally for rust identification and screening for reaction to various wheat rusts. Some area also devoted to propagation of F2 materials coming from wide-cross activities, principally with triticale.

CIMMYT HEADQUARTERS PROFESSIONAL STAFF LIST (GRADES I – IV)

Program or Function	Name, Nationality and Position
Administration	Haldore Hanson, U.S.A., Director General Robert D. Osler, U.S.A., Deputy Director, Resident Programs Keith W. Finlay, Australia, Deputy Director, Outreach & Special Programs Bernard G. Henrie, U.S.A., Controller Emilio Madrid C., Chile, Executive Officer
Wheat	Norman E. Borlaug, U.S.A., Director, Wheat Program R. Glenn Anderson, Canada, Associate Director, Wheat Program Maximino Alcala S., Mexico, In charge International Wheat Nurseries Arnoldo Amaya C., Mexico, Wheat Cereal Chemist Armando Campos V., Mexico, Wheat Breeder (Bread Wheats) R. Anthony Fischer, Australia, Wheat Agronomist/physiologist Santiago Fuentes F., Mexico, Wheat Pathologist M. M. Kohli, India, Wheat Breeder (Triticale) John H. Lindt, U.S.A., Wheat Training Agronomist Marco A. Quiñones, Mexico, Wheat Breeder (Durum Wheats) Sanjaya Rajaram, India, Wheat Breeder (Bread Wheats) Enrique Rodríguez, Mexico, Barley Breeder Frank J. Zillinsky, Canada, Wheat Breeder (Triticale)
Maize	Ernest W. Sprague, U.S.A., Director, Maize Program Alfredo Carballo Q., Costa Rica, Maize Breeder Michael Colegrove, U.S.A., Maize Agronomist Carlos De León, Mexico, Maize Pathologist Peter R. Goldsworthy, U.K., Maize Agronomist Gonzalo Granados, Mexico, Maize Entomologist Mario Gutiérrez G., Costa Rica, Maize Geneticist E. C. Johnson, U.S.A., Maize Breeder R. J. Laird, U.S.A., Maize Agronomist Alejandro Ortega C., Mexico, Maize Entomologist Antonio Turrent F., Mexico, Maize Training Agronomist S. K. Vasal, India, Maize Breeder Willy Villena D., Bolivia, Maize Breeder Alejandro Violic, Chile, Maize Training Agronomist
Service Laboratories	Evangelina Villegas M., Mexico, Chemist in charge of Laboratories
Economics	Donald Winkelman, U.S.A., Agricultural Economist
Experiment Stations	John A. Stewart, U. K., Agronomist, in charge of Stations
Information Services	Gregorio Martínez V., Mexico, in charge of Communications Dean C. Bork, U.S.A., English Editor Gil Olmos B., Mexico, Visual Aids Specialist

Chart 14

CIMMYT OUTREACH PROFESSIONAL STAFF LIST (GRADES I – IV)

Commodity	Country	Name, Nationality and Position
Maize	Colombia	Canuto Cardona, Colombia, Maize Agronomist
	Egypt	N. L. Dhawan, India, Maize Breeder/Agronomist
	Nepal	Melvin Splitter, U.S.A., Maize Breeder/Agronomist
	Pakistan	Takumi Izuno, U.S.A., Maize Breeder A. Frederick Palmer, U.K., Maize Agronomist
	Zaire	Thomas Hart, U.S.A., Maize Agronomist/Team Leader Frans de Wolff, Netherlands, Maize Breeder Mahesh Pandey, India, Maize Plant Protection Specialist
Wheat	Algeria	Willis McCuistion, U.S.A., Wheat Breeder/Team Leader Herbert Floyd, U.S.A., Wheat Agronomist Walter Nelson, U.S.A., Wheat Breeder/Agronomist Francisco Plouin, Mexico, Wheat Agronomist
	Morocco	Aristeo Acosta, Mexico, Wheat Breeder William E. Hall, U.S.A., Wheat Agronomist
	Tunisia	John Doolette, Australia, Wheat Agronomist/Team Leader Johnston Douglas, U.S.A., Seed Production Specialist Torrey Lyons, U.S.A., Wheat Agronomist George Varughese, India, Wheat Breeder
	Turkey	Arthur Klatt, U.S.A., Wheat Breeder Jon M. Prescott, U.S.A., Wheat Pathologist

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WHO SUPPORTS CIMMYT?

Donors to CIMMYT include international organizations, national governments, and private Foundations. They give three kinds of support:

(1) Core unrestricted. These funds are used for:
  (a) Annual operating funds.
  (b) Capital funds for land, buildings, and equipment with useful life of more than 5 years.
(2) Core restricted. These funds are for activities specified by the donors.
(3) Special programs. These funds are most often assistance to Governments, outside Mexico, to conduct maize and wheat production programs.

Tables 1 - 3 below give the income of CIMMYT, and the donors, during 1966-72.

Table 1. CORE UNRESTRICTED DONORS, 1966 - 72 (U. S. $ 000)
(see note on the next page for explanation of Donors Abbreviations)

Donor	1966	1967	1968	1969	1970	1971	1972
RF 1/	441	485	777	737	3321	2687	750
FF	—	263	528	730	750	750	1033
USAID	—	—	—	425	625	769	1090
IBRD	—	—	—	—	—	—	1000
Denmark	—	—	—	—	—	—	100
Total	441	748	1305	1892	4696	4206	3973

1/ Including Special Capital Construction and Equipment Grants from 1968-1971

Table 2. CORE RESTRICTED GRANT EXPENDITURES, 1966 - 72 (U. S. $ 000)

Program and Donor	1966	1967	1968	1969	1970	1971	1972
Plan Puebla (RF)	—	31	80	87	89	105	77
High Protein Quality Maize (UNDP)	—	—	—	—	150	343	407
Triticale (CIDA/IDRC)	—	—	—	—	—	82	260
Other (various donors)	16	64	42	74	82	100	20
Total	16	95	122	161	321	630	764

Table 3. SPECIAL PROGRAM FUNDS, 1966 - 72 (U.S. $ 000)

Program and Donors	1966	1967	1968	1969	1970	1971	1972
Wheat and Maize - Argentina (FF)	--	--	3	48	34	17	35
Wheat and Maize - Pakistan (FF)	49	341	274	255	157	135	105
Wheat - North Africa (FF)	--	--	34	118	165	327	445
Wheat - North Africa (USAID)	--	--	60	151	154	145	76
Wheat - Turkey (RF)	--	--	--	--	16	46	73
Maize - Egypt (FF)	--	--	12	69	6	31	26
Maize - Central America (RF)	--	--	--	9	5	13	--
Maize - Zaire (GOZ)	--	--	--	--	--	26	233
Maize - Nepal (USAID)	--	--	--	--	--	--	27
Training (BID)	--	--	--	--	--	72	91
Potatoes - Mexico and Pakistan (RF)	--	--	--	112	135	164	139
Other (varios donors)	--	--	5	45	62	107	138
Total	49	341	388	807	734	1083	1388

FF - Ford Foundation
RF - Rockefeller Foundation
USAID - U. S. Agency for International Development
IBRD - International Bank for Reconstruction and Development
CIDA - Canadian International Development Agency
IDRC - International Development Research Council
GOZ - Government of Zaire
UNDP - United Nations Development Program
BID - Banco Interamericano para el Desarrollo (Inter-American Development Bank)