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PROGRAMME PLANNING

COUNTRY AND INTERCOUNTRY PROGRAMMES AND PROJECTS

CONSIDERATION AND APPROVAL OF GLOBAL AND INTERREGIONAL PROGRAMMES AND PROJECTS

Project recommendation of the Administrator

Assistance for a global project

International Maize Testing Programme and Selected Training Activities (GLO/84/002)

Estimated UNDP contribution:	$5 400 000
Duration:	Five years
Executing agency:	UNDP

I. BACKGROUND

1. Among cereal crops, maize possesses the highest genetic yield potential, has enormous genetic variation and is adapted to an extremely wide range of climatic conditions. It is a crop of many productive uses. In addition to its value as a foodstuff and as the major animal feed, maize also has many industrial uses such as starch, cooking oil, sweeteners, and more recently, biomass and gasohol.

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2. In most developing countries in which maize is an important food crop, yields are low, averaging about 1.5 tons per hectare. Although one half of the world's maize area is planted in the developing countries of Asia, Africa and Latin America, only one-third of the world crop is harvested there. Most of the maize produced in these countries is a subsistence crop, usually grown on soils of low fertility under rainfed conditions characterized by seasonal problems of moisture stress and poor weed control.

3. The Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT), which is part of the network of international agricultural research centres sponsored by the Consultative Group on International Agricultural Research (CGIAR), originally began as a collaborative programme between the Government of Mexico and the Rockefeller Foundation for the improvement of maize and wheat. At present, CIMMYT's mandate also covers work on barley and triticale.

4. CIMMYT fulfills its mission in the following ways: (a) conducting research in Mexico and elsewhere for higher and more dependable yields and higher nutritional quality; (b) distributing superior germ plasm to national programmes; (c) developing procedures for crop improvement and crop management research; (d) conducting applied training for scientists from developing countries; (e) sponsoring technical workshops, seminars and symposia; (f) publishing information on new technological components; (g) consulting with Governments in developing countries on the organization and execution of maize and wheat research and production programmes; and (h) assigning staff members to work in regional and national programmes outside Mexico. The major objective of the research programme is to develop superior germ plasm for the production environments of the developing world. This involves making thousands of crosses each year, using seven research sites in Mexico, and subsequently testing these in over 100 countries throughout the world. The results of this vast international testing programme enable CIMMYT to select materials having wide adaptation, high-yield potential, and disease and insect resistance and tolerance. The materials are made available to national research organizations for further breeding and selection for local conditions.

5. During the current decade, CIMMYT will give considerable emphasis to breeding maize for greater genetic resistance to pests and diseases and further strengthening the stability of yield in difficult production environments. It is confidently expected that during the current decade varieties with improved disease resistance will be available for release to farmers in many affected areas. At the same time, work will continue on increasing the ratio of grain to total plant yield and on incorporating higher nutritional quality into a range of preferred maize types. A strong effort will be mounted in production-oriented research through the regional programmes and through training activities (both at headquarters and through the regional programmes).

6. In 1982, CIMMYT shipped 632 individual maize trials to collaborators in 73 countries. Two of the 1982 international testing programme trials included CIMMYT's high-yielding, agronomically superior quality protein maize materials. The maize grown by collaborators in 1982 was generally higher yielding, shorter, and earlier

maturing than local varieties used for comparison. The plants were also more responsive to improved management and had an increased yield potential, largely through a higher grain harvest index. Many CIMMYT materials also showed greater resistance to pests (especially fall armyworm) and diseases (especially foliar diseases).

7. Since the CIMMYT maize programme began its current scheme of population improvement and international testing less than a decade ago, more than 600 experimental varieties have been developed. Twenty-five national programmes, drawing on germ plasm from the international testing programme, have released more than 100 varieties during the last five years. Dozens of new varieties are now in the final stages of national varietal testing programmes and commercial release. In addition, larger seed quantities (1-2 kg.) of selected experimental varieties were provided to more than two dozen requesting countries for on-farm testing and national seed multiplication programmes.

8. Training is a major dimension of CIMMYT's total programme effort. Training activities in Mexico, within the regions and in national programme settings, stressed the strengthening of applied research skills needed to conduct effective crop research programmes. During 1982, in maize, 46 scientists from 24 developing countries attended in-service training courses. Another 15 visiting scientists were provided travel fellowships to visit CIMMYT during the year, spending from one week to three months in Mexico. In 1982, CIMMYT also co-operated in the training of 11 master's degree students and 1 pre-doctoral candidate. In addition, 6 post-doctoral fellows and 3 associate scientists were in residence in Mexico during the year. In-country training programmes in maize crop production were also conducted in Bolivia, Honduras, Kenya and Pakistan. Since 1970, more than 700 individuals from 68 countries have completed in-service training in all aspects of maize improvement at CIMMYT.

9. UNDP has provided financial support to CIMMYT over the last 10 years for the development of quality protein maize. The main objective of UNDP's support has been to assist developing countries in improving the protein content of the diet of their peoples through: (a) intensifying research on raising the quantity and quality of protein in maize in combination with high yield; and (b) training agronomists to conduct national programmes of nutritive maize production, and to conduct on-farm trials designed to provide guidance to national extension staff, agronomists and policy makers.

10. Substantial UNDP inputs into this research effort now conducted by CIMMYT in Latin America and the Caribbean, Africa and Asia have made it possible to obtain several experimental varieties of the quality protein, hard endosperm maize which have been tested in 38 different locations around the world; chemical tests for lysine and tryptophan have been refined and several protein laboratories around the world have been set up to assist breeders in the selection of the best seeds for crossing; large numbers of developing country personnel are being trained in all aspects of quality protein maize production and testing; feeding tests with animals and children in several countries have demonstrated that the new improved maize is superior in nutritional quality. Current research on quality protein maize is being concentrated mostly on farmers' fields around the world to conclusively demonstrate that large-scale production of the nutritively rich maize is possible.

11. UNDP's sustained assistance to the research at CIMMYT has contributed to a major breakthrough in the development of the high quality protein maize. This is indeed a spectacular achievement in research on plant breeding and genetics involving a crop which constitutes the staple diet of millions of people in the world. A stage has been reached where efforts should be made to encourage countries to adopt the nutritively rich maize on a large scale, though it is recognized in several countries that an active promotional campaign is needed to familiarize farmers and senior government officials with the potential benefits of the new maize.

12. CIMMYT's present proposal for continuation of UNDP assistance to research and training in maize improvement for a period of five years presents a new image involving three programme thrusts: international testing; training; and nutritional studies. Through the proposed project, CIMMYT would be able to sustain and expand its international maize testing and to transfer to developing country farmers improved maize varieties, combining higher yield and nutritional quality. Over 50 per cent of the funds requested from UNDP would be spent on training developing country scientists at various levels in all aspects of maize improvement. The nutritional studies outlined in the proposal would be an essential complementary activity to be implemented by the Instituto de Investigación Nutricional (IIN) in Peru under subcontractual arrangements with CIMMYT.

13. The overall programme of CIMMYT, including the work on maize improvement, was evaluated in May 1983 by an independent panel of outstanding scientists on behalf of the Technical Advisory Committee of the CGIAR. This panel was much impressed with the high quality of CIMMYT's work and of its staff. In noting the outstanding achievements of CIMMYT's programmes, the panel strongly recommended that, in order to enable CIMMYT to carry on the successful work, especially the development of stronger links with national programmes and training developing country personnel, sustained financial support be provided to CIMMYT on a long-term basis by the donor community.

II. THE PROJECT

14. The main purpose of the project is to help developing countries through provision of support to sustain and expand the international maize testing programme and to make available improved and nutritionally superior varieties to farmers. The general objectives of the project are to:

(a) Expand and intensify international testing of promising varieties (normal protein as well as nutritionally superior materials) under different agro-ecological conditions on experiment stations, as well as on farmers' fields;

(b) Expand and strengthen CIMMYT's maize training activities in all aspects, but especially in the area of in-country training outside Mexico, of crop management research methodologies;

(c) Carry out a series of nutrition studies in children using CIMMYT's more recently developed quality protein maize (QPM) varieties through a collaborative project with scientists from the Instituto de Investigación Nutricional (IIN), Lima, Peru.

15. The international testing programme will provide the following:

(a) A senior co-ordinating specialist, as well as CIMMYT staff and consultants, to developing countries to assist their national programmes;

(b) Shipment of improved seeds for international trials, data processing and analysis of results;

(c) Improved networking arrangements between CIMMYT and national collaborators;

(d) Utilization of improved statistical designs and analytical programmes;

(e) Increased assistance in seed production and distribution: and

(f) Additional nutritional studies in collaboration with the Instituto de Investigación Nutricional (IIN) in Peru.

16. Training at CIMMYT and provision of support to in-service training activities in national programmes will be a major component of the project, taking up nearly 56 per cent of the total UNDP contribution. Through CIMMYT headquarters staff, as well as its regional specialists, a greatly expanded training effort will be mounted. This will include visiting scientists, middle-level training for junior personnel and limited graduate fellowships to qualified staff of selected developing countries which are urgently in need of such assistance. Workshops, seminars and conferences will be organized from time to time to facilitate the exchange of knowledge and experiences among the maize scientists.

17. In order to assess the impact of the project activities at the farm level and to measure the effectiveness of the various training programmes, UNDP will provide, under its direct costs component, funds for required consultancies in order to undertake an independent evaluation. It is anticipated that such an assessment will be made at two different periods: midway in the course of the project and at the end. Visits will be made to selected countries around the world in order to provide adequate coverage of the countries involved so that the assessment will be meaningful. Special attention will be given in that evaluation to the outcome of the project with regard to strengthening national maize improvement and extension programmes and the utilization of new technologies by farmers resulting in increased production.

18. The Administrator intends, through contractual arrangements between CIMMYT and UNDP, to entrust the implementation of this project to CIMMYT with the clear understanding that the Directorate of CIMMYT will seek the advice of the Food and Agriculture Organization of the United Nations (FAO). As in the past, UNDP will follow closely all the developments in this global project and, together with FAO, will participate in the Project Advisory Committee which will be established for the project. A concerted effort will be made for linking the research activities to be undertaken with field work being undertaken at the country and intercountry levels. The Project Advisory Committee, which will oversee this co-ordination, will

include renowned scientists currently engaged in all relevant aspects of maize breeding, genetics, testing and nutrition research. The Committee normally will meet once a year to appraise ongoing research activities and to advise on its future direction. Specialists from other international centres will be invited, as appropriate, to serve on this Committee.

19. Midway in the course of the project, UNDP, in consultation with CIMMYT, might decide to schedule an evaluation of the project activities to be undertaken by a team of two or three independent consultants. Such an evaluation, if needed, could be undertaken in conjunction with one of the Project Advisory Committee meetings mentioned in paragraph 18 above. In any event, towards the completion of the project, a thorough evaluation of the results and accomplishments of the project will be mounted by UNDP, in consultation with CIMMYT, to be carried out by independent and prestigious consultants.

20. The proposed support to be extended to CIMMYT by UNDP during 1985, the first full year, represents 21 per cent of the total running core budget of the maize programme of the Centre, which is estimated at $4.9 million. During the project period, 1985-1989, the proportion will remain approximately the same. The balance of CIMMYT's budget is being financed by other members of the Consultative Group on International Agricultural Research. UNDP will not contribute towards any capital expenditures which might be made by CIMMYT in addition to its regular budget.

21. The expenditure component of the proposed UNDP contribution is:

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Subcontract	5 022 000
Direct costs	378 000
Total	5 400 000

This project is submitted for approval by the Governing Council, subject to the approval of the Administrator's proposal for limited borrowing from the fourth programming cycle for the global programme as outlined in document DP/1984/20/Add.1.
