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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 Rice Testing and Improvement Programme, Phase II  
(GLO/84/001)

Estimated UNDP contribution:	\$9 200 000
Duration:	Four years
Executing agency:	UNDP

I. BACKGROUND

1. In 1976, UNDP helped launch the International Rice Testing Programme (IRTP), based at the International Rice Research Institute (IRRI) in the Philippines. The main objective was for developing country scientists to participate in systematic testing and development of diverse rice strains adapted to different agro-ecological conditions. In the current project, approved in 1980 under the title "International Rice Testing and Improvement Programme" (IRTIP), UNDP provides for greatly expanded networks of international rice nurseries, germ plasm collection, co-operative research on innovative techniques for breeding and improvement; enlarged research on biological nitrogen fixation in rice paddy soils; and research on the response of different rice varieties under different climatic conditions.

2. The development of varieties adapted to different growing conditions has been achieved by IRTTP by building a network for the exchange of rice varieties and breeding lines (the precursors of varieties) between countries and regions.
3. The programme on nitrogen fixation in rice paddy soils has studied the role of micro-organisms in fixing nitrogen as part of the process of natural plant nutrition. The ultimate goal is to help paddy rice farmers reduce their dependence on artificial nitrogen fertilizers.
4. Training and scientific collaboration have developed rapidly. By 1982, nearly 300,000 seed packets of more than 2,500 rice varieties had been sent to 70 countries for trials. Several promising rice varieties identified have shown substantial yields at the farm level. The tests covered widely varying conditions (cold, drought, salinity, alkalinity, acidity, diseases, insect pests, etc.) and trial results are analyzed and disseminated by a computer-based system.
5. Approximately 20 per cent of the current project is devoted to training. To date, 367 scientists from 29 countries in Asia, Africa and Latin America have been trained in genetic evaluation and utilization which provides the basic skills needed to operate national rice improvement programmes. More than 400 scientists from 37 countries participated in IRTTP monitoring tours and visited 140 rice research stations and institutes. It also strengthened collaboration among rice scientists around the world through numerous conferences, workshops, seminars, monitoring tours and training programmes. IRTTP has now become an invaluable vehicle for technical co-operation among rice scientists of developing countries around the world.
6. The current IRTTP project at IRRI was recently evaluated by a UNDP-commissioned team of three independent consultants. The report of this mission has highlighted several impressive achievements of the project, and has unhesitatingly recommended continuation of follow-up support from UNDP. The proposed four-year follow-up would provide for an expanded IRTTP network to better serve the needs of countries in Africa, Latin America and the Caribbean. Approximately 40 per cent of the contributions requested from UNDP would be allocated to training of developing country personnel. As a result of modest UNDP inputs, substantial additional inputs will be mobilized through IRRI's core programme on rice research and improvement, of which IRTTP is the cornerstone.

## II. THE PROJECT

7. The main purpose of the project is to enable IRRI to continue and expand the highly successful work of IRTTP to include East Africa and the Caribbean regions, presently not covered, and to bring to fruition relevant research on biological nitrogen fixation which has shown considerable promise. While many of the principal activities of the current UNDP project will be continued, some changes in emphasis would be made.

A. The International Rice Testing Programme (IRTP)

8. With respect to IRTP, the expanded effort would involve:

- (a) Increased activities in Africa and Latin America through the provision of regional co-ordinators for East Africa and the Caribbean regions;
- (b) Identification of severe stress sites for diseases such as blast and sheath blight, and selection of materials for resistance to these diseases;
- (c) Identification and characterization of sites for selection of improved materials for rainfed wetland and upland conditions, and generation of materials for testing for improved performance at those sites;
- (d) Selection of materials with specific tolerances for inclusion in a "hybridization" nursery which can be made widely available;
- (e) Improved computer-based recording and analysis of data, and rapid dissemination of results to all collaborators; and
- (f) involvement of national programme scientists in the management of the IRTP.

B. The nitrogen fixation (BNF) component

9. This will involve studies on the use of water fern Azolla, nitrogen-fixing bacteria associated with the rice plant, and blue-green algae (BGA) which live in rice paddies. It is proposed that studies on each of these components should be continued, but again, with some change in emphases as follows;

(a) Azolla studies: the collection and evaluation of different Azolla species and strains will be continued but greater emphasis will be given to:

- (i) Agronomic testing and identification of ecological and economic conditions which favour effective use of Azolla as a source of nitrogen for rice; and
- (ii) Involvement of more countries in field experiments with Azolla, to extend the range of environmental conditions to which Azolla can be adapted.

(b) Work on blue-green algae: major emphasis will be on ecological studies. It is proposed to develop:

- (i) Standard, quantitative methods which will enable the results of BGA inoculation experiments to be interpreted with confidence;
- (ii) Field studies in a wide range of environmental conditions, to establish the principal factors controlling algal development and persistence; and

(iii) A network of collaborators for information exchange, and a mini-network of collaborators who will conduct inoculation experiments under carefully monitored conditions.

(c) Nitrogen-fixing bacteria: The most important result obtained in studies of nitrogen fixation associated with the rice plant, is that the rice plant itself may stimulate the bacteria which fix nitrogen. The ability to do this differs between rice varieties. Hence, the possibility exists that the ability to fix nitrogen can be bred into varieties with other desirable traits. This work will be continued, to identify the factors involved and determine whether the character can be transferred between rice plants. This will involve the following activities:

(i) Development of a rapid screening method using labeled nitrogen to simplify the identification of plants with the ability to stimulate nitrogen fixation;

(ii) Collaboration with plant breeders to study the transfer of the characteristic to widely utilized rice varieties;

(iii) Field studies in a range of environments to determine how external factors modify the quantities of nitrogen fixed;

(iv) Inoculation studies to determine whether better nitrogen-fixing bacteria can be introduced to increase the amount of nitrogen fixed by plants with the greatest ability to stimulate fixation.

#### C. Training and staff improvement

10. Training and staff development will be a major component of the total International Rice Testing and Improvement Programme and will receive over 40 per cent of the contribution requested from UNDP. Interdisciplinary teams of scientists concerned with rice genetic evaluation and utilization will be invited to participate in formal, four-month training courses. A course of special interest to those concerned with biological nitrogen fixation will be offered through IRRI's International Network in Soil Fertility Evaluation for Rice. Several scientists from countries in the tropics would participate in this course each year. The intensive training activities, covering advanced degree training and research fellowship awards, participation in conferences, symposia, workshops, and monitoring tours when performance of rice varieties in different environments is reviewed, will be expanded. The training courses in genetic evaluation and utilization will be held twice yearly at IRRI, the International Institute of Tropical Agriculture (IITA) and West African Rice Development Association (WARDA) in Africa, and the Centro Internacional de Agricultura Tropical (CIAT) in Latin America will assist in these training programmes, particularly for French- and Spanish-speaking trainees. The participation of trainees from Africa and Latin America will be increased.

11. The international rice testing and improvement programme will be implemented by IRRI in collaboration with major rice-growing countries of the developing world and with developed country institutions as needed. The field and greenhouse aspects of these studies, along with confirmatory experiments under laboratory conditions, will be conducted by IRRI, while in-depth studies on basic research may be conducted at selected institutions in developing as well as developed countries.

12. Execution of the project will involve, as explained above, the development and testing of new and improved field, greenhouse and laboratory evaluation techniques, and a constant rechecking of results obtained in laboratory experiments with those under natural field conditions. Methods developed as a result of these tests will then be field-tested under a wider range of conditions. The work on biological nitrogen fixation will be co-ordinated with that of scientists in other leading laboratories around the world, including the research and development programme at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), IITA, ICARDA, CIAT and WARDA. Special arrangements will be made for developing close co-operative links with national programmes in selected developing and developed country institutions.

13. The results obtained through the activities described in the preceding paragraph will be used to develop an applied research project that will first be conducted under field conditions at IRRI and a few other selected locations in different countries. IRRI scientists will organize this applied research and will provide uniform instructions for implementing the tests and provide assistance to co-operators in the initiation and monitoring of the tests. Careful records will be kept on each test and the data will be compiled by IRRI for discussion at annual conferences to be held among the principal investigators.

14. 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 rice improvement and extension programmes and the utilization of new technologies by farmers resulting in increased production.

15. The Administrator intends, through contractual arrangements between IRRI and UNDP, to entrust the implementation of this project to IRRI with the clear understanding that the Directorate of IRRI 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. As indicated in paragraph 12 above, 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 rice breeding, genetics, testing and biological nitrogen fixation 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.

16. Midway in the course of the project, UNDP, in consultation with IRRI, might decide to schedule an evaluation of 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 15. 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 IRRI to be carried out by independent and prestigious consultants.

17. The proposed support to be extended to IRRI by UNDP during the first full year during 1985 represents 12 per cent of the total running core budget of the rice programme of the Institute, which is estimated at \$15.5 million. During the project period 1985-1988, the proportion will remain approximately the same but will be decreased subsequently. The balance of IRRI'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 IRRI in addition to its regular budget.

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

	\$
Subcontract	8 792 100
Direct costs	<u>407 900</u>
Total	<u>9 200 000</u>

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.

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