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資　料　篇

資 料I. ビルマ地域農業試験場強化計画

1. Project: Strengthening of Regional Agricultural Experiment Stations.

2. Description of Project:

The duration of the project should be 3 years commencing June 1978.

	Project activities	Location	Starting date and proposed duration
(i)	Review of organization of the Regional Agricultural Experiment Stations and survey of field and laboratory equipment and supplies.	Rangoon Hmawbi Mandalay Magwe	July 1978 for 2 months
(ii)	Prepare a list of field and laboratory equipment and supplies and place orders, including spare parts.	- do -	August 1978 for 1 month
(iii)	Planning and conduct of crop breeding and adaptability trials of improved crop varieties.	- do -	From September 1978 till the project comes to an end.
(iv)	Planning and conduct of agronomic, cultural and fertilizer experiments on the Stations as well as on the farmers' fields.	- do -	- do -
(v)	Training national scientists and technicians in the fields of crop breeding, agricultural chemistry and agronomy (irrigation and water management).	Various locations as mentioned in relevant paragraphs	Each fellowship is of 12 months duration. Programme starts October 1978.

3. Economic and Social Signigicance of the Project:

1. Its long-range objectives are as follows:

(i) To increase the production of major exportable crops for expanding export trades.

(ii) To improve the production of deficit crops to meet national consumption requirements.

(iii) To produce adequate supply of industrial crops to meet the requirement of factories within the country.

Immediate Objectives

2. The immediate objectives are as follows:-

(i) To strengthen and improve three Regional Agricultural Experiment Stations at Hmawbi, Mandalay and Magwe so that ultimately a better service can be given to the farmer on a regional basis.

(ii) To evolve high yielding varieties of rice, wheat, groundnut, maize and soybean adaptable to local conditions of the regions.

(iii) To evolve better cultivation methods for getting higher yields.

(iv) To conduct experiments on efficient use of fertilizers for different soils.

(v) To conduct analysis on soils of the regions and to advise on the more effective use of fertilizers.

(vi) To maintain genetic purity and increase pure seed stock of improved crop varieties already distributed for further multiplication.

(vii) To serve as a training ground for regional field extension workers as well as for the farmers themselves.

4. Cost Estimation

Total Project Budget Covering Grant and Government Contribution

Title: Strengthening of Regional Agricultural Experiment Stations

(Kyat in thousands)

Particulars	Total	1978-79	1979-80	1980-81	1981-82
Project Personnel					
Experts (Grant)	1,210	181	484	424	121
Local Staffs	895	150	298	298	149
Training (Grant)					
Individual fellowship	435	36	145	145	109
Equipments					
Grant	2,946	1,129	887	672	258
Local	1,728	288	576	576	288
Miscellaneous (Grant)	67	7	20	20	20
Grant	4,658	1,353	1,536	1,261	508
Local	2,623	438	874	874	437
Total	7,281	1,791	2,410	2,135	945

5. Technical Cooperation

Assignment of International Staff

(i) Crop Breeder – Specializing in breeding of rice and having a considerable knowledge of breeding cereals, oil crops and food legumes, preferably Ph. D. in plant breeding and genetics. Will be responsible for crop breeding, adaptability tests of improved crop varieties and also responsible for coordinated research works with the experts working together with him. Will also serve as the team leader of the project. His assignment will cover a period of 36 months, starting from July 1978. Duty station will be Rangoon.

(ii) Agronomist – Specializing in irrigation and water management. Preferably Ph. D. in agronomy. Will be responsible for conducting agronomic experiments on crops in coordination with other experts. His assignment will cover a period of 24 months starting from October 1978. Duty station will be Rangoon.

Training provisions

The aspects of training will cover crop breeding, agronomy and chemistry, one trainee each for each subject component mentioned above, from every Regional Experiment Station under the project, will be seconded for training abroad. The training period for each subject will be for a duration of one year commencing from October 1978. The tentative training schedule is as follows:-

	Subject	Starting date	Duration
(a)	Plant Breeding		
	(1) Rice	October 1978	12 m/m
	(2) Food Legume	October 1979	12 m/m
	(3) Oil Crops	October 1980	12 m/m
(b)	Agronomy		
	(1) Maize	October 1978	12 m/m
	(2) Food Legume	October 1979	12 m/m
	(3) Wheat	October 1980	12 m/m
(c)	Agricultural Chemistry		
	(1) One trainee	October 1978	12 m/m
	(2) One trainee	October 1979	12 m/m
	(3) One trainee	October 1980	12 m/m

In addition to the above, the experts will also be engaged in providing training for the local staff in the above subjects, as well as other relevant matters.

6. Others

(1) The proposed project will be implemented by Agriculture Corporation of the Ministry of Agriculture and Forest.

(2) Burma is a country of diverse climatic and soil conditions. This has led to the establishment of sixteen Regional Agricultural Experiment Stations in various Divisions and States to conduct applied research and sovle regional problems of agriculture in cooperation with the Agricultural Research Institute. To improve the yield and quality of crops, agricultural research programmes in these Regional Agricultural Experiment Stations are mainly orientated towards varietal improvement, improved cultural practices, better fertilizer use and efficient plant protection methods best suited to local conditions. However, as most of these stations are under-staffed and not well equipped, the research efforts are not as effective as they should be in increasing the agricultural production of the country. The research effort needs to be expanded by way of strengthening of staff and equipment. It is confidently expected that as a result of such action increasingly fruitful research results will be obtained which will be applicable to local agriculture. The three Regional Stations to be strengthened are as follows:

	Name of Station	Division	Major Crops
(1)	Hmawbi Station	Rangoon	Rice (Rainfed)
(2)	Mandalay Station	Mandalay	Rice (Irrigated)
(3)	Magwe Station	Magwe	Groundnut, Sesamum and Sun Flower

All the activities of the project will be carried out under the aegis of the Agriculture Corporation which is a component of the Ministry of Agriculture and Forests.

資　料Ⅱ．ビルマ病害虫防除普及事業強化計画

STRENGTHENING OF THE PLANT PROTECTION EXTENSION SERVICES

Sr. No.	Subject	Clarification
1	Name of the Proposed Project	Strengthening of Plant Protection Extension Services.
2	Description of the Project	(1) The main aim of the Project is to achieve the maximum production level of agricultural produce by protecting the various crops from the ravages of pests, weeds, diseases, rodents, etc., to fulfill the country's internal requirements and also increasing the volume of export. (2) The project will be implemented by the Agriculture Corporation under the Ministry of Agriculture and Forests. (3) Activities in plant protection are carried out in co-ordination between the Agricultural Research Instiutte, the Division of Research and the Division of Extension Services (4) The part of the project to be supported by the Japanese grant (viz. the grant part) will be in the form of (a) technical know-how and advice (b) training of local personnel (c) equipment aid (with expendable and non-expendable) including laboratory equipments, chemicals etc. and (non-expendable items such as motor vehicles, field equipments, mobile workshop for repair and maintenance of sprayers and dusters. (5) The Burmese Government will provide respective counterparts, field staff, locally available equipment and buildings (storage godowns) and office space.
3	Economic and Social Significance of the Project	As an agricultural country Burma has to face the problems of controlling pests on all major crops and field crop losses has been estimated at an annual average of 2.4% incidence on major crops, viz. rice, grounding sesamum, cotton, jute, sugarcane, pulses, tobacco, maize, onion, chillies, rubber. The national loss due to pests has been estimated at Kyats 5.7 to 8.4 crores annually. This is a substantial drain and the implementation of

Sr. No.	Subject	Clarification
		of the project is aimed to prevent this loss.
4	Objectives of the Project	(A) Immediate objectives. (1) to strengthen the present plant protection services, and to educate the farmers on crop protection methods. (2) to assist and advise the farmers on modern plant protection techniques. (3) to establish an integrated and united plant protection programme. (4) training of field personnel for pest control work. (5) development of practical and rational control measures of pests and diseases of the major crops for adoption by the cultivators from research results of the Agricultural Research Institute at Yezin. (6) to assist in organising control compaigns against emergency and large scale pest outbreaks through mobile plant protection units, and mass movement control measures. (7) to advise the Government regarding enforcement of plant protection and pesticide regulations and implementation of safety measures for safe use of pesticides through pesticide registration and residue monitoring. (8) to advice and assest in the control of pests for the effective implementation of the seed-certification scheme. (B) Long range objectives (1) With the implementation of this project it is envisaged to improve & strengthen the Plant Protection Service of the Agricultural Corporation so that annual crop losses could be kept at the lowest minimum. (2) The project also aims at creating an awareness of the primary role of the Village Councils and the People's

Sr. No.	Subject	Clarification
		Peasants Councils in the Implementation of the plan in the agricultural sector.
5	Project Cost	(1) The total cost for the whole project and the grant part is estimated as $(U.S. Dollar) 765,000 as shown in Annexure (A). (2) The Counterpart funds to be borne by the Government of Burma during the period of implementation is estimated at Ks.9.57 Million.
6	Implementation Period	The period of implementation will be three years beginning from 1977/78 to 1980/81.
7	Technical Cooperation	The following specialised personnel will be needed: (a) Team Leader: (one) Job requirements: all round Knowledge of plant protection work and extension work, will be responsible for co-ordinating the work of the field worker under him and for advice to counterpart staff. (b) Pest Control Specialist (one) He will be primarily responsible for testing chemical control techniques recommended by the Agricultural Research Institute for field experiments and demonstration plots on pesticide use, for collaboration in residue monitoring. (c) Plant Protection Extension Specialist (one) He will be responsible for the improvement of plant protection extension activities, the development of pest and disease surveillance forecasting. (d) Consultants (As and when needed: 24 m/m) Plant protection legislation, pesticide regulations, plant pest and disease forecasting, technology, crop loss assessment, weed and rodent control.
8	Others	(1) Organisational Structure The organisation will be part of the Division of Extension Services within the Agricultural Corporation, under the Ministry of Agriculture and Forests. The Chief Extension Officer will be the executive head while an entomologist will be the field leader. There are (14) State and Divisional pest control officers who will be responsible for their respective State or Divisions.

Sr. No.	Subject	Clarification
		They in turn will be controlling the (28) Village Tract Pest Control Inspectors and (112) Village Pest Control Assistants. Apart from the field staff, counterparts will be provided for the following project experts: (a) Plant Protection Specialist (b) Pesticide Application Specialist (c) Plant Protection Extension Specialist (2) Government Contribution The Socialist Republic of the Union of Burma will contribute all the field staff expenditure and other contingencies to carry out this project and is estimated at Ks. 9,567,000.

Annexure (A)

Grant Input

		Duration	Cost U.S.$
(A)	International Experts		
(1)	Plant Protection Specialist	36	108,000
(2)	Pesticidal Control Specialist	24	72,000
(3)	Plant Protection Extension Specialist	24	72,000
(4)	Consultants (as and when required)	24	72,000
		Total	336,000
(B)	Training		
	Fellowships (Insect Control of Storage Pests, Weed Control, Plant Quarantine, Surveillance, & Forecasting)	24	45,000
(C)	Supplies and Equipment		
(1)	Expendable Equipment and pesticides for demonstration, chemicals for laboratory supplies, Tools and spares		36,000
(2)	Non-expendable Equipment Vehicles for field staff, Trucks for transport of Stores equipment, Workshop Vans, Light motorbikes, Out-board motors, Power sprayer and dusters, Seed treatment equipment, Knapsack sprayers, Laboratory equipment, Audio-visual aids, Office equipments		313,000
(D)	Miscellaneous		
(1)	Operation & maintenance of equipment		30,000
(2)	Sundry		5,000
		Grand Total:-	765,000

Annexure (B)

Cost Estimation

Project Title: Strengthening of the Plant Protection Extension Services.

(Kyat in thousands)

Sr. No.	Particulars	1978-1979	1979-1980	1980-1981	Total
1	2	3	4	5	6
1	Experts	363	1,048	847	2,258
2	Training	140	140	23	303
3	Equipment	1,304	1,041		2,345
4	Miscellaneous	110	80	45	235
	Sub-total (F.E)	1,917	2,309	915	5,141
	Expenditure to be covered by local Kyats	7,698	973	896	9,567
	Total	9,615	3,282	1,811	14,708

資 料Ⅲ. UNDP PROJECT DOCUMENT OF SEED DEVELOPMENT IN BURMA
PROJECT DOCUMENT

Title:	Seed Development
Project No.:	BUR/77/008/A/01/42 Duration: Four Years
Primary Function:	Direct Support
Secondary Function:	Experimental and Research
Sector (Vov't. Class):	Agriculture/Forests UNDP Class & Code: Agriculture, Forestry & Fisheries (05)
Sub-Sector (Gov't. Class):	Plant Production UNDP Class & Code: Plant Production (0510)
Government Implementing Agency:	Ministry of Agriculture and Forests
Executing Agency:	World Bank
Estimated Starting Date:	April 1978
Government Inputs:	K573,900 (in kind) UNDP Inputs: $975,000

Signed: _____ Date: 06 April 1978

On behalf of the Government
(Dr. Maung Shein)
Deputy Minister,
Ministry of Planning and Finance

_____ Date: 06 April 1978

On behalf of the Executing Agency
(Kenneth Watts)
Resident Representative, UNDP

_____ Date: 06 April 1978

On behalf of the United Nations
Development Programme
(Kenneth Watts)
Resident Representative, UNDP

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PART I. LEGAL CONTEXT

This Project Document shall be the instrument (therein referred to as a Plan of Operation) envisaged in Article I, paragraph 2, of the Agreement between the Government of the Socialist Republic of the Union of Burma and the United Nations Development Programme concerning assistance under the Special Fund sector of the United Nations Development Programme, signed by the Parties on 10 January 1961.

PART II. THE PROJECT

A. Development Objective

This project, in conjunction with an IDA-assisted Seed Development Project, will strengthen applied agricultural research and assist seed industry development through modest rice and cotton seed multiplication and distribution programmes and a pilot groundnut storage programme. The IDA project will provide the basic infrastructure for the development of an applied agricultural research and a seed production and distribution capability in Burma.

The two projects will be complementary and together will:

(i) supply sufficient rice seed to enable the cultivation of 3.5 M acres of new HYV within five years of its release,

(ii) result in an incremental rice production of about 188,000 metric tonnes by year 10,

(iii) result in a 5% reduction in the seed used for cotton cultivation since project seed will be of superior quality, and

(iv) result in a 25% reduction in groundnut seed prices in areas served by the projects' groundnut seed stores. This price reduction is expected to increase the area sown to groundnut by 20%.

B. Immediate Objectives

To assist GOB in:

(a) developing an applied agricultural research programme within ARD for, *inter alia,* rice, cotton seed and groundnuts and developing the capacity to execute such a programme,

(b) initiating seed multiplication and distribution programmes for rice and cotton which would lay the foundation for subsequent expansion of the seed industry,

(c) planning and supervising the development of six applied research/seed farms,

(d) establishing the feasibility of groundnut storage in Lower Burma through a pilot storage project,

(e) identifying specific ARD staff training requirements and those institutions overseas capable of providing the necessary training, and

(f) providing on-the-job training in farm development, farm management, seed production, processing, storage and distribution and applied research, through formal short courses and "learning by doing".

C. Special Considerations

Not applicable.

D. Background and Justification

(a) Background

Burma covers an area of about 680,000 square kilometers and has a population of approximately 31 million. About 66% of the workers were employed in agriculture in 1975/76. Burma's agricultural crop sector accounts for 27% of GDP, employs 66% of the work force and accounts for 58% of exports. During the last decade, the average annual growth rate of the sector was only 2.3% compared to a population growth rate of 2.2%. Constraints to growth include shortage of improved seeds, fertilizer, production equipment and inadequate research and extension services. The Government has given priority to the development of agriculture with the goals of achieving self-sufficiency in food, earning foreign exchange, and generating sufficient production to meet the needs of State-owned agro-industries.

Of the total 23 million acres cropped area, rice accounts for 55%, oil-seeds 19%, pulses 8%, and other cereals 5%, fibre crops 2%, and other crops 11%. Irrigated land covers 12% of the net cultivated area.

Rice is grown mainly in Lower Burma. Yields are low by South Asian standards averaging about 1,500 lbs per acre. High yielding varieties account for only 8% of the sown area largely because of the shortage of suitable HYVs, fertilizer and draft animals. Rice production has stagnated during the last decade because of a static acreage, and only minor yield increases. Any significant yield breakthrough will depend on the widespread adoption of high yielding varieties.

The Agricultural Research Institute (ARI) has a well advanced program to produce high yielding varieties suitable for areas subject to moderate flooding; it is expected that they will release such HYV within the next three to four years. Such HYV would enable HYV cultivation to expand significantly, perhaps to as much as 5 million acres.

Long staple (G. hirsutum) cotton is grown on about 160,000 acres in irrigated areas of Upper Burma, mainly as a pre-monsoon crop. The average yield of about 220 lb of seed

cotton per acre is particularly low: Factors responsible for low productivity include, inappropriate varieties, inadequate insect control, inadequate phytosanitary practices, poor land preparation, use of poor quality seed, and until recently, low prices for seed cotton which made the crop less attractive to farmers. ARI has a variety improvement program underway and in the near future expects to release jassid-resistant varieties better adapted to Burmese conditions than the present American varieties (mainly Stoneville 213). The provision of improved seed is an essential prerequisite to such a program.

Groundnuts are grown on about 1.7 million acre and are used mainly to produce groundnut oil which is an important component of Burmese diet. Groundnuts are grown in two seasons in Burma; as a monsoon crop in the low rainfall, light soil areas of Central Burma, and as a post-monsoon crop, on residual moisture, mainly in Lower Burma. Due to the difficulty of successfully storing seed in farms in Lower Burma during the monsoon, farmers in Lower Burma must purchase all seed for the post monsoon crop from farmers in Central Burma. Because of a general shortage of groundnut oil and a restricted seed supply, seed prices are extremely high.

Basic agricultural research is the responsibility of the Agricultural Research Institute (ARI), a division of the Agricultural Corporation (AC) under the Ministry of Agriculture and Forests. Assisted by a UNDP project, started in 1974, considerable progress has been made in strengthening ARI, though the rate of development of its main Yezin station needs to be accelerated. With expected staff increase and probable further support from UNDP and the International Rice Research Institute, basic research capacity is no longer a primary constraint to agricultural development. It is likely that within three to four years ARI will have developed high yielding rice varieties suitable for medium-deep water areas, and jassid-resistant varieties of medium staple cotton.

The Applied Research Division (ARD), also a division of the AC, is responsible for translation of ARI's basic research into regionally adapted technologies. This applied research is carried out on 16 Central Farms located throughout Burma. In addition, ARD is responsible for seed production on the Central Farms and 54 widely dispersed Seed Farms. In contrast to ARI, ARD is undeveloped and suffers from a serious staff shortage, inadequate research facilities, and undeveloped farms. The Government intends to improve ARD's applied research and seed production capability so that proper use is made of the research output from ARI.

Seed Production and Distribution. The majority of seed used in Burma is supplied by farmer retention and farmer to farmer trade. The limitations of this traditional practice can be overcome through an organized seed supply system which would introduce and spread new varieties, maintain varietal purity, and provide reliable supplies of seed where on-farm storage conditions are adverse. Only small quantities of seed are produced by ARD because its farms are under-developed, under-staffed, and poorly equipped.

There are no systematic quality control procedures for field inspection or laboratory analysis. Furthermore, multiplication is not based on the recognized hierarchy of generations - breeder, foundation, registered and certified, - and thus trueness to type cannot be maintained. The physical quality of seed is poor due to inadequate processing and storage treatment.

Under the Program of Pre-Investment and Investment Assistance, financed by UNDP and executed by the World Bank, a Seed Development Project was prepared by the Government of Burma with assistance from consultants, Bureau pour le Development de la Production Agricole (BDPA). The project was appraised by the World Bank in March 1977. The Board of Executive Directors of the International Development Association (IDA) approved a credit of $5.5 million for the Seed Development Project, November 1, 1977. During the negotiation of the credit, an agreement was reached among the Government, UNDP and the World Bank, that UNDP would finance the technical assistance (with World Bank as Executing Agency) which would be a vital component of the project.

(b) Justification

The success of the Seed Development Project will largely depend on the strength of the key Government organization, which, in this case, is ARD. The shortage of trained manpower in ARD will be addressed partly by providing training for Burmese staff (financed by IDA under the Seed Development Project), but technical assistance is proposed to achieve results in the short term. The technical assistance will cover the following three fields; farm development, farm management, and applied research.

Farm Development. Many of ARD's Central Farm and Seed Farms were established more than 40 years ago. Poor initial layout combined with inadequate maintenance and general low standards of management have substantially reduced productive capacity. The Seed Development Project would develop six ARD farms by providing finance for land development, equipment and buildings, and manpower development. The consultants would plan and supervise the execution of the work and train ARD staff in land development planning and execution.

Farm Management. The consultants would be required to develop a farm management capability within ARD and to formulate a five-year management plan for each of the farms developed under the IDA-assisted project.

Applied Research. The consultants, working through the National Research Coordination Committee (NRCC) would assist the Government establish priorities for applied research and formulate a research program to be initiated during the four years of the project. The consultants would also be responsible for the training of ARD staff to enable them to implement the project.

E. Outputs

The consultants will produce the following reports/documents:

	Report/Document	Tentative Completion Date
	Farm Development:	
(1)	Equipment requirements for each of the six farms,	4/78
(2)	Detailed development plans, including farm layout and irrigation design, for each of the six farms to be developed,	3/79
(3)	Equipment maintenance manuals to serve as a guide for ARD staff,	4/79
(4)	Bidding documents for equipment required by the project,	6/79
	Farm Management:	
(5)	Systems for farm record keeping, inventory control, accounts & crop budgeting,	12/78
(6)	Background material and lecture notes for refresher courses in crop husbandry, soil science, irrigation technology, seed production, processing and storage,	12/78
(7)	Guidelines for preparation of further development proposals for the external financing,	6/79
(8)	Farm management plans extending over five years for each of the farms developed under the project,	9/79
	Applied Research:	
(9)	An inception report indicating priorities for applied agricultural research and the rationale for their selection,	7/78
(10)	Terms of reference for specialist research consultants including reporting requirements,	7/78
(11)	Background material for courses on the conduct and analysis of field experiments,	9/78
(12)	Individual reports by research specialists leading to a proposed research program with details of individual research projects and objectives,	5/79

(13)	Technical reports by research specialist within above research programme*,	7/79
(14)	Record of annual review of research activities including results and recommendations for further research.	By end of April each year.

Note: * Timing to be determined.

F. Activities and Work Plan

Whereas the World Bank, in its capacity as Executing Agency, will exercise overall technical supervision and administrative control of the UNDP project, the consultants will be responsible to the Managing Director, Agricultural Corporation in undertaking the activities of the project which will include:

	Project Activities	Duration and Starting Date	Completion Date
1.	Establish land development equipment requirements for the development of six farms	One Month 4/78	5/78
2.	Prepare bidding documents and generally supervise equipment procurement following the World Bank guidelines	Two Months* 4/78	6/79
3.	Design farm layouts for irrigation (2,550 ac), irrigation rehabilitation (820 ac), and rainfed farming (1,130 ac)	Eight Months 5/78	3/79
4.	Establish a mobile maintenance workshop and other permanent workshops	Three Months* 7/78	12/79
5.	Design a system to supply irrigation water to areas not commanded	Two Months 10/78	12/78
6.	Formulate programme and train operators in use and maintenance of equipment & manuals to be prepared	Four Months* 2/79	1/80
7.	Supervise land development operations	Twenty Months* 2/79	3/81

* Indicates that the activity is carried out intermittently during the period between starting and completion dates.

Farm Management:

1.	Formulate a 5 year management plan for each of the farms to include farm development operations, seed production and research activities as part of the overall project	Three Months* 10/78	9/79
2.	Preparation of relevant material, formulation of training programme and train ARD staff in all aspects of farm management including cropping programs, machinery and labor scheduling, farm records and accounts, preparation of development proposals for external financing, conduct of field experiments, crop husbandry, soil science, irrigation technology, and seed production and processing	Sixteen Months* 10/78	6/80

* Indicates that the activity is carried out intermittently during the period between starting and completion dates.

Applied Research:

1.	Review and report on current state of agriculture in Burma to identify research priorities	Four Months 4/78	8/78
2.	Conduct investigation into rice processing, cotton cultivation and processing, and groundnut storage using short term consultants not included in the main consultancy contract	Sixteen Months* 4/78	3/81
3.	Prepare terms of reference, locate and recruit research specialists	Three Months 6/78	12/80
4.	Initiate research sub-programs and identify requirements for equipment, facilities, and training	Twelve Months* 7/78	12/80
5.	Preparation of relevant material, formulation of training programme and training ARD staff in the conduct of applied research, identify staff training requirements and propose suitable means for overseas training	Twelve Months* 7/78	12/80
6.	Formulate an applied research program to be initiated during the IDA financed project	Six Months* 8/78	7/79

7.	Analyze and evaluate the results from the research sub-programs	Six Months* 7/79	6/81

* Indicates that the activity is carried out intermittently during the period between starting and completion dates.

G. Inputs

(a) Government Inputs

The consultants would work as an integral part of ARD and share ARDs supporting staff and facilities which will be strengthened under the IDA-assisted project. In particular the Government will provide the following:

(1) Suitably qualified counterpart staff who will be the ARD officers with executive responsibility for the particular field. There will be at least one counterpart for each member of the consulting team including a counterpart team leader as well as a "liaison" officer with non-technical responsibilities,

(2) Suitable office space and hard furniture, to accommodate the entire consulting team and their counterparts in working proximity to ARD staff,

(3) Office supplies and basic office equipment (filing cabinets, telephones, and stationery),

(4) Accommodation and sustenance for the consulting team and their counterparts at Government Guesthouses whenever possible while the consultants are in the field,

(5) Assistance to the consultants in locating and negotiating suitable rental accommodation in Rangoon,

(6) A suitably qualified adminsitrative officer to be seconded to the consultants for administration, record keeping and reporting, and

(7) Drivers, fuel and lubricants and maintenance for the UNDP supplied vehicles comprising three four-wheel drive vehicles and one microbus-type vehicle.

(b) UNDP Financed Inputs

	Location	Starting Date & Proposed Duration
1. Subcontract:		
1.1 Consulting Services:		
Project Supervisor	Rangoon	5 m/m
Team Leader	Rangoon	26 m/m
Research Specialist	Rangoon	18 m/m
Irrigation Engineer	Rangoon	1 m/m
Irrigation Design Specialist	Rangoon	6 m/m
Equipment Procurement Specialist	Rangoon	2 m/m
Equipment Operations Supervisor	Rangoon	8 m/m
Irrigation Design Assistant	Rangoon	3 m/m
Workshop Specialist	Rangoon	5 m/m
Heavy Equipment Specialist	Rangoon	4 m/m
Farm Machinery Specialist	Rangoon	5 m/m
Applied Research Scientists	Rangoon	30 m/m
		113 m/m

2. Consultant's Travel & Other Costs

	Delivery Date
1.2 Vehicles	4/78
3 4-wheel Drive vehicles	
1 Microbus-type vehicles	
1.3 Office Equipment	4/78
2 Typewriters (English)	
1 Photocopier plus suppliers	
2 Calculators	
5 Air conditioners for office use	
Miscellaneous equipment	
Survey equipment	
Drafting & reproduction equipment	
Field experimental equipment	

2.0 Miscellaneous and Sundries

H. Preparation of Work Plan

The detailed work plan and scheduling of tasks will be fomulated by the consultants in consultation with ARD. The main work components and estimated timing and duration are shown in Part II, F. A bar chart for the project is shown in Annex I*. The manning table of the consultants is shown as Annex II.

* To be elaborated.

I. Preparation of the Framework for Effective Participation of National and International Staff in the Project

The activities necessary to produce the indicated outputs and achieve the Project's immediate objectives will be carried out jointly by the national and international staff assigned to it. The respective roles of the national and international staff will be determined by their leaders, by mutual discussion and agreement, at the beginning of the project.

J. Development Support Communication

The applied research findings shall be reported and these reports circulated to those Government agencies (notably the Extension Division) responsible for disseminating such findings. The Extension Division has an obligation under the IDA-assisted Seed Development Project to demonstrate new varieties of rice prior to their release.

K. Institutional Framework

The technical assistance project is an integral part of an IDA-assisted Seed Development Project.

Project implementation would principally involve the Agricultural Corporation (AC). The various divisions within AC which would be involved in the project are as follows:

(i) The Applied Research Division (ARD) will be the main implementing agency responsible for seed production and applied research and overall project management. The organization of ARD would be modified to separate seed production and research functions from adminsitration, budget, and training and to locate the former functions under a new deputy general manager (Seeds and Research),

(ii) The Agricultural Research Institute (ARI) will be responsible for production of all breeder seed and some foundation seed. ARI would also monitor quality control procedures,

(iii) The Extension Division (ED) would conduct demonstrations of new varieties, provide advice on their cultivation, participate in the formulation of research programs and help organize production of commercial cotton seed, and

(iv) The Procurement Division (PD) would distribute seeds produced by ARD.

The Textile Industries Corporation (TIC) would own and operate the ginneries at which the commercial cotton seed would be ginned and adjacent to which the ARD owned and operated cotton seed storage, processing and packaging facilities would be constructed.

A National Seed Committee (NSC) would be formed to provide a forum for the determination of seed policy. In particular, it would be responsible for variety release, variety recommendation and quality control standards and procedures. During the project period it would monitor and coordinate project activity. Membership would comprise representatives of the Ministry of Agriculture and Forests, (Planning and Statistics Department, Managing Director of AC and General Managers of ARI, ARD, Extension and Procurement Divisions); the Ministry of Planning and Finance, (Foreign Economic Relations Department and Planning Department); the Ministry of Industry I; the Trade Ministry and the Central People's Peasants Council.

(1) A technical sub-committee would be formed to handle variety release and variety recommendation and to develop, and keep under review, quality control standards and procedures. Senior technical staff from ARI, ARD and the Extension Division would be co-operated to serve on this sub-committee. It would be a condition of effectiveness of the IDA-assisted project, that the NSC had been formed with composition and powers satisfactory to IDA.

Research Coordination Committees (RCC) would be formed for each Central Farm. They would comprise representatives of ARD, ARI and the Extension Division. The RCC would discuss research results, and problems encountered by extension workers. In the light of these discussions, recommendations would be made for the next season's research program, and for recommendations to be used by the Extension Division.

National Research Coordination Committee (NRCC) would be formed to consider the recommendations from the RCC and to finalize research programs and extension recommendations from the RCC and to finalize research programs and extension recommendations. Given the feedback from the RCC, the NRCC would also be an excellent forum for discussion of additions and/or changes to ARI's program of basic research at Yezin. The NRCC would comprise the General Managers of the ARD, ARI and ED, and such of their senior staff as they co-operated for their assistance, plus a representative of the Planning and Statistics Department; a Secretariat would be provided by ARD.

L. Prior Obligations and Prerequisites

Prior Obligations:

None.

Prerequisites:

(1) Subject to any security provisions in force at the time of the project, the Govern-

ment will make available for the purpose of the project, any published and unpublished reports, maps, records and other information and data necessary to the implementation of the project, and facilitate the consultants' travel for the purpose of the project, to make field visits within the country,

(2) The Government will make available the inputs described under Part II G, Government Inputs, and

(3) The Project Document will be signed by the Resident Representative on behalf of UNDP receiving satisfaction that the prerequisites listed above have been fulfilled. If anticipated fulfilment of one or more prerequisites fails to materialize, UNDP may, at its discretion, either suspend or terminate its assistance.

M. Future UNDP Assistance

No further UNDP assistance is envisaged at present. However, the matter will be reviewed during the course of the present project.

PART III. REPORTS

A. Schedule of Monitoring, Evaluation and Reports

The project will be subject to periodic review in accordance with the policies and procedures established by UNDP for monitoring project and programme implementation.

The World Bank Headquarter staff will also make periodic supervisory visits to the project.

B. Evaluation

The project will be subject to evaluation in accordance with the policies and procedures established for this purpose by UNDP. The organization, terms of reference and timing of the evaluation will be decided after consultation amongst Government, UNDP and the World Bank.

C. Progress and Terminal Reports

Reflecting the specific nature of the project, i.e., a technical assistance component of an IDA-assisted Seed Development Project, the progress reports of the consultants, and the various occasional report referred to in Part II E, will be integrated into the Government's quarterly progress report to IDA. The first quarterly report is due June 30, 1978.

In addition, the consultants will submit semi-annual progress reports to UNDP. The first semi-annual report will be due September 30, 1978.

PART IV. BUDGET

A. Project Budget Covering UNDP Contribution (in US Dollars)

Country: Socialist Republic of the Union of Burma
Project No.: BUR/77/008/A/01/42
Project Title: Seed Development

	Total $	1978 $	1979 $	1980 $	1981 $
20 SUBCONTRACT					
21 Subcontract	996,950	340,300	348,600	199,200	78,850
29 Component Total	966,950	340,300	348,600	199,200	78,850
50 MISCELLANEOUS					
53 Miscellaneous	8,050	2,000	3,000	2,000	1,050
59 Component Total	8,050	2,000	3,000	2,000	1,050
99 GRAND TOTAL	975,000	342,300	351,600	201,200	79,900

B. Project Budget Covering Government Contribution in Kind (in Local Currency)

Country: The Socialist Republic of the Union of Burma
Project No.: BUR/77/008/A/01/42
Project Title: Seed Development

	Total m/m Ks	1978 m/m Ks	1979 m/m Ks	1980 m/m Ks	1981 m/m Ks
10 PROJECT PERSONNEL					
11 Counterparts and Consultants (4)	171,300	35,300	52,100	57,300	26,600
19 Component Total	171,300	35,300	52,100	57,300	26,600
40 EQUIPMENT					
41 Equipment	307,400	78,000	85,800	94,200	49,400
49 Component Total	307,400	78,000	85,800	94,200	49,400
50 MISCELLANEOUS					
51 Miscellaneous	95,200	25,000	27,500	30,000	12,700
59 Component Total	95,200	25,000	27,500	30,000	12,700
99 GRAND TOTAL	573,900	138,300	165,400	181,500	88,700

BURMA SEED DEVELOPMENT PROJECT

Technical Assistant Schedule

Activity	Year	1				2				3				4			
	Quarter	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
1. Team Leader/Research	26 man-months																
2. Farm Management	26 man-months																
3. Irrigation Design & Supervision	10 man-months																
4. Equipment Procurement & Training	14 man-months																
5. Research Specialist	24 man-months																
6. Rice Processing Specialist	3 man-months																
7. Cotton Specialist	7½ man-months																
8. Groundnut Specialist	6 man-months																

September 22, 1977

PART V. ORGANIZATION OF THE PROJECT

General Responsibilities

1. The Government, the UNDP and the Executing Agency shall cooperate in the execution of the Project with a view to the realization of the objectives described in Part II of the Project Document.

2. The Government shall provide to the Project the required national personnel, training facilities, land, buildings and other services, equipment and facilities. It hereby designates the party named on the cover page of the Project Document as the Government cooperating agency (herein referred to as "the Cooperating Agency") which will be directly responsible for the carrying out of the obligations of the Government provided for in the Project Document.

3. The UNDP undertakes to complement and supplement the Government participation and will provide through the Executing Agency the required expert services, training, equipment and other services within the funds available to the Project.

4. The Executing Agency shall carry out its obligations in accordance with the provisions of the Project Document in consultation with the Cooperation Agency.

5. In the event that the Government's participation includes a cash contribution to the UNDP, the UNDP shall make such contribution available to the Executing Agency to be applied by it in respect of the services, equipment or facilities to which such contribution relates. The Executing Agency shall account to the UNDP in respect of such cash contribution in accordance with the provisions of paragraph 15 hereof and in turn the UNDP will account annually in respect thereof to the Government.

Participation of the Government

6. The Government shall provide to the Project the services, equipment and facilities in the quantities and at the times specified in the Work Plan, shall make the counterpart contribution – either in kind or in cash – provided for in the Project Budget subject to paragraph 8 hereof.

7. The Cooperating Agency shall in consultation with the Executing Agency assign a director for the Project on a full-time basis. He shall carry out such responsibilities as are assigned to him by the Cooperating Agency.

8. The estimated cost of the items included in the Government contribution, as detailed in the Project Budget, is based on the best information available immediately prior to the date of the Project Document. It is understood that price fluctuations during the period of execution of the Project may necessitate an adjustment of the said contribution in monetary terms. Such contribution shall accordingly at all times to be determined by the actual cost of the services, equipment and facilities required for the proper execution of the Project.

9. Within the aggregate number of man-months of personnel services provided for in the Work Plan, minor adjustments of individual assignments of personnel provided by the Government may be made by the Government in consultation with the Executing Agency, if such adjustment is in the best interests of the Project.

10. The Government shall continue to pay the local salaries and appropriate allowances of national personnel during the period, if any, of their absence from the Project while on IDA/ UNDP fellowships.

11. The Government shall defray any customs duties and other charges related to the clearance of proejct equipment, its transportation, handling, storage and related expenses within the country. It shall be responsible for safe custody of the equipment, its installation and maintenance, insurance, and replacment if necessary, after delivery to the project site.

12. Subject to any security provisions in force at thedate of the Project Document the Government shall:

(a) make available to the Executing Agency and otherwise for the purposes of the Project any published and unpublished reports, maps, records and other information and data which are necessary to the implementation of the Project; and

(b) enable authorized representatives of the UNDP, the Executing Agency and of its consultants to visit any part of its territories for the purpose of the Project and to examine any records and documents relevant thereto.

13. The Government shall assist all the non-national personnel assigned to the Project in finding suitable housing accommodation at reasonable rents.

14. Payment of the counterpart contribution in cash, if any, to be made by the Government as herein provided shall be made in local currency to the UNDP in accordance with the Schedule of Payments included in the Project Budget. Payment of such contribution to the UNDP on or before the dates specified in the said Schedule of Payments by the Government is a prerequisite to commencement or continuation of the Project by the UNDP and the Executing Agency, but without prejudice to any rights, obligations or liabilities of the UNDP or the Executing Agency existing as at any such specified date.

Participation of the UNDP and of the Executing Agency

15. (a) The UNDP shall provide to the Project through the Executing Agency the services, equipment and facilities described in the Wrok Plan and, for such purpose, shall from time to time, promptly upon receipt of notice from the Executing Agency, make available to the Executing Agency such amounts in such currencies as it shall specify in the said notice in respect of the total actual costs of the Project.

(b) The Executing Agency shall:

(i) make payments for the actual costs of the Project components specified in the Project Budget hereto but only to the extent that funds shall have been received by the Executing Agency in accordance with sub-paragraph (a) hereof;

(ii) Exercise in the administration and disbursement of such funds the same care that it applies to the administration of its own funds and maintain records and accounts of funds received and disbursed by it hereunder; and

(iii) until final settlement with the UNDP, furnish to the UNDP, in accordance with a schedule to be agreed, quarterly Project delivery reports and year-end financial reports, in such detail as the UNDP may reasonably request.

(c) The accounts in respect of the Project shall be closed as soon as practicable after the completion thereof and, save in exoeptional circumstances, not more than 12 months thereafter.

16 (a) Where the Project includes provision for a Project Manager or other non-national project personnel, the Executing Agency shall, in consultation with the Government, select and assign to the Project such personnel under contract with the Executing Agency.

(b) The Executing Agency shall, in addition, select, in consultation with the Government, candidates for fellowships and determine standards for the training of national personnel, if any.

(c) The Project Manager, if any, shall be responsible in the country for the carrying out of the obligations of the Exeucting Agency provided for in the Project Document and for the management of all equipment provided to the Project from UNDP funds, and shall supervise the non-national personnel assigned to the Project and the on-the-job training of national personnel.

17. Fellowships shall be administered in accordance with the fellowship regulations from time to time established by the Executing Agency.

18. The Executing Agency may, in agreement with the Government and the UNDP, execute part or all of the Project by subcontract. The selection and appointment of subcontractors shall be made, after consultation with the Government, in accordance with the Executing Agency's procedures for UNDP projects.

19. All material, equipment and supplies which are purchased from UNDP resources shall be used exclusively for the execution of the Project, and shall remain the property of the UNDP (in whose name it will be held by the Executing Agency) until completion of UNDP assistance to the Project. Equipment supplied by the UNDP shall be marked with the insignia of the UNDP and of the Executing Agency.

20. Prior to completion of UNDP assistance to the Project, the Government, the UNDP and the Executing Agency shall consult as to the disposition of all Project equipment provided by the UNDP. Title to such equipment shall normally be transferred to the Government, or to an entity nominated by the Government, when it is required for continued operation of the Project or for activities following directly therefrom. The UNDP may, however, at its discretion, retain title to part or all of such equipment.

21. At an agreed time after the completion of UNDP assistance to the Project, the Government and the UNDP and, if necessary, the Executing Agency shall review the activities continuing from or consequent upon the Project with a view to evaluating its results.

The Basic Agreement: Facilities, Privileges and Immunities

22. (a) In accordance with the Agreement concluded by UNDP (Special Fund) and the Government concerning the provision of assistance (the Basic Agreement), the UNDP, the Executing Agency and other United Nations organizations associated with the Project, and their respective personnel, shall be accorded the facilities, privileges and immunities specified in the Basic Agreement.

(b) The Project Document is the document (therein referred to as a Plan of Operation) provided for in paragraph 2 of Article I of the Basic Agreement. The Executing Agency, by its execution of the Project Document, accepts in relation to the Project the provisions of the Basic Agreement (subject as hereinafter mentioned) and accordingly the Government, the UNDP and the Executing Agency agree that such provisions shall be incorporated in and form part of the Project Document with the same force and effect as if such provisions were fully set forth herein, subject, however, to the provisions of sub-paragraph (c) hereof.

(c) For the purposes of the Project Document:

(i) paragraph 2 of Article II of the Basic Agreement shall not apply,

(ii) paragraph 3 of Article II of the Basic Agreement shall not apply to arrangements of an administrative nature made by the Executing Agency in the ordinary course of supervising the Project in accordance with the Project Document,

(iii) all references in paragraph 6 of Article VIII of the Basic Agreement to an Executing Agency or its personnel (but not to other persons performing services on behalf of an Executing Agency) shall be deemed omitted, and

(iv) the terms "Special Fund" and "Plan of Operation" wherever they appear in the Basic Agreement shall be deemed to read "UNDP" and "Project Document", respectively.

23. (a) The Government shall facilitate clearance through its customs of any equipment, materials and supplies required for the purpose of carrying out the Project, and of the personal effects of the non-national personnel assigned to the Project.

(b) The Government shall make arrangements for all non-national personnel assigned to the Project and their families promptly to be provided with any necessary entry and exit visas, residence permits, exchange permits and travel documents required for their stay in the territories of the Government in connection with the Project.

(c) Promptly upon receipt by the Government of the monthly statements of expenditures submitted by the Consultants retained by the Executing Agency, the Government shall review such statements and, upon approval thereof, forward them to the Executing Agency. Prior to submission to the Executing Agency of the first such statement of expenditures, the Government shall furnish to the Executing Agency and to such consultants sufficient evidence of the authority of the person or persons who will approve such statements on behalf of the Government, together with the specimen signatures of such person or persons.

24. The Government shall indemnify the Executing Agency and members of its staff for any liability arising out of acts or omissions of such staff members in connection with this Project Document or the execution of the Project, except where resulting from willful misconduct or gross negligence. Such indemnification shall include, without limitation, attorneys' fees, court costs and other expenses incurred by the Executing Agency or members of its staff in connection with the defense against, or settlement of, claims on account of such liability.

25. The Government shall exempt all consultants retained by the Executing Agency and the personnel (other than residents of the territories of the Government) of such consultants from, or bear the cost of, any taxes, duties, fees or other levies imposed under laws and regulations in effect in its territories or by any political sub-division or agency therein on such consultants and personnel in respect of:

(i) any payment made to such consultants or personnel in connection with the execution of the Project;

(ii) any equipment, materials and supplies brought into the territories of the Government for the purpose of carrying out the Project and subsequently withdrawn therefrom; and

(iii) any personal and household effects brought into the territories of the Government by such consultants and personnel and subsequently withdrawn therefrom upon departure of the said consultants and personnel.

26. The Executing Agency shall provide the Government through the Resident Representative with the list of personnel to whom the privileges and immunities enumerated above shall apply.

27. The Project Document shall be free from any taxes imposed under the laws of the Government or laws in effect in its territories on or in connection with the execution, delivery or registration thereof.

Consultation

28. The Government, the UNDP and theExecuting Agency shall at such times as shall be mutually agreed exchange views on the Project, including the progress and costs thereof and the benefits derived therefrom and each shall furnish to the others such information as shall reasonably be requested in respect thereof.

Reports

29. The Executing Agency shall furnish to the UNDP periodical reports on the carrying out of the Project at such times and in such form as may be agreed between the UNDP and the Executing Agency.

Settlement of Disputes

30. (a) Any dispute between the Exeucting Agency on the one hand and the Government on the other arising out of or relating to the Project Document and which cannot be settled by negotiation or other agreed mode of settlement shall be treated as a dispute between the UNDP and the Government and shall be submitted to arbitration at the request of either the Executing Agency or the Government in the manner set forth in Article IX of the Basic Agreement; provided however, that the foregoing provisions of this paragraph (a) shall not apply where the UNDP and the Executing Agency are agreed that the subject matter of such dispute results from the wilful misconduct or gross negligence of members of the staff of the Executing Agency.

(b) Notwithstanding any termination of the Project Document pursuant to paragraph 32 hereof, the provisions of this paragraph shall continue in fullforce and effect in respect of any dispute arising either before or after termination, provided such dispute shall be submitted to arbitration within six months after the date of such termination.

Suspension: Termination Notices

31. (a) The UNDP shall be entitled by notice to the Government and the Executing Agency to suspend the assistance to be provided by it in accordance with the Project Document if any condition arises which interferes with or threatens to interfere with the successful completion of the Project or the accomplishment of the purposes thereof; the UNDP shall consult the Government and the Executing Agency before any such suspension.

(b) Any suspension pursuant to paragraph (a) of this Section shall continue until such time as the UNDP shall give notice to the Government and the Executing Agency

that it is willing to resume such assistance.

32. (a) If any condition referred to in paragraph 31 (a) hereof shall continue for a period of fourteen days after notice thereof shall have been given by the UNDP to the Government and the Executing Agency, then at any time thereafter during the continuance of such condition, the UNDP may be notice to the Government and the Executive Agency terminate this Project Document; the UNDP shall consult the Government and the Exeucting Agency before giving such notice.

(b) The Project Document may be terminated by the Government, the UNDP or the Executing Agency by at least sixty days' prior notice to each of the others; the UNDP or the Executing Agency, as the case may be, shall consult the othr before giving such notice.

33. Any notice or rquest required or permitted to be given or made under the Project Document shall be in writing. Such notice or request shall be deemed to have been duly given or made when it shall have been delivered by hand, mail, telegram or cable to the party to which it is required to be given or made at such party's address specified below or at such other address as such party shall have designated by notice to the party giving such notice or making such request.

Governing Text

34. If the parties shall sign the Project Document in French or Spanish in addition to English, both such texts shall be equally authentic, and the provisions of the Project Document shall be read and construed accordingly.

資 料Ⅳ. UNDP PROJECT DOCUMENT OF CROP DEVELOPMENT IN BURMA
PROJECT DOCUMENT

Title:	Crop Development in Burma
Project No.:	BUR/77/009/A/01/12 Duration: Four Years
Primary Function:	Direct Support
Secondary Function:	Crop Production Research and Extension
Sector (Gov't. Class): For	Agriculture/Forests UNDP Class & Code: Agriculture, Forestry & Fisheries (05)
Sub-Sector (Gov't. Class):	Plant Production UNDP Class & Code: Plant Production (0510)
Government Implementing Agency:	Agriculture Corporation, Ministry of Agriculture and Forests
Executing Agency:	The Food and Agriculture Organization of the United Nations (FAO)
Government Inputs:	32,645,740 (in kind) (Kyats)
UNDP Inputs:	2,902,844 (U.S. Dollars)

Signed:

On behalf of the Government
Dr. Maung Shein,
Deputy Minister for Planning and Finance

Date: 26 February 1979

On behalf of the Executing Agency
Mr. J.G. Devitt, FAO Representative

Date: 26 February 1979

On behalf of the United Nations
Development Peogramme
Mr. Kenneth Watts, Resident Representative

Date: 26 February 1979

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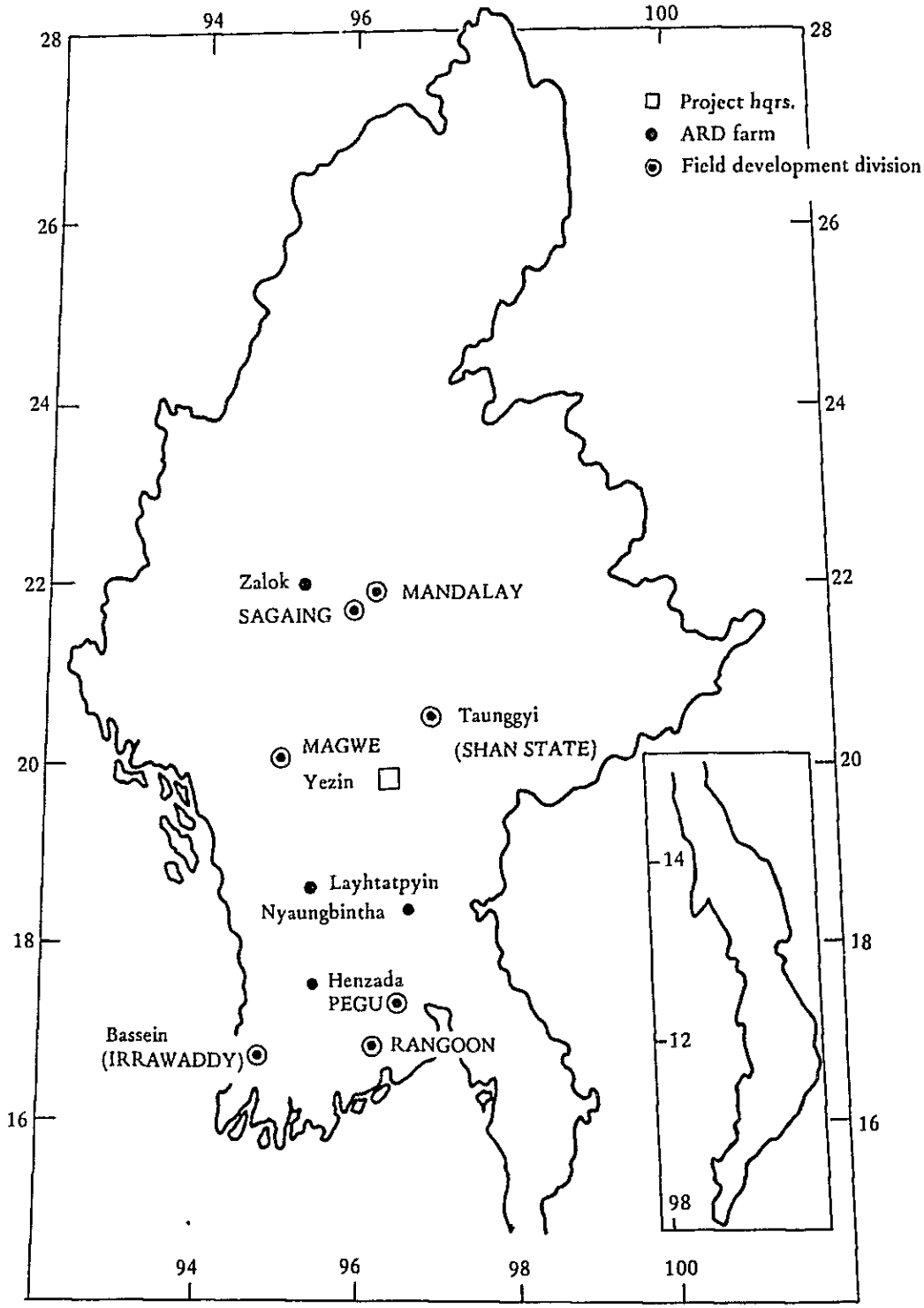
MAP OF BURMA

UNDP/FAO/BUR/77/009

CROP DEVELOPMENT PROJECT



PART I. LEGAL CONTEXT

This Project Document shall be the instrument (therein referred to as a Plan of Operation) envisaged in Article I, paragraph 2, of the Agreement between the Government of the Socialist Republic of the Union of Burma and the United Nations Development Programme concerning assistance under the Special Fund sector of the United Nations Development Programme, signed by the Parties on 3 January 1961.

PART II. THE PROJECT

A. Development Objective

Agriculture constitutes the key sector of the national economy of Burma. Improvement in agricultural production is recognised as vital for the overall economic development of the country visualised under the long term twenty-year prospective plan and the component four-year economic plans of the Government.

This project will accelerate the improvement and development of important field crops like wheat, maize, sugarcane, sunflower and groundnut during the current third four-year plan period (1978-79 to 1981-82), which has a targetted annual average growth rate of 5.8 percent in agricultural production.

B. Immediate Objective

The UNDP/FAO assisted Project BUR/72/003 "Strengthening of the Agricultural Research Institute, Yezin" implemented during 1974-1978 has identified feasible lines of development for improving the production of crops like rice, cotton, food legumes and jute and has demonstrated that the yield and quality of these crops can be improved. Apart from rice which will be further developed under the IRRI/Burma/CIDA project and cotton which will be developed under BUR/78/001, "Cotton Development", the present project is intended to foster similar development of other crops, consolidate the facilities built up at the ARI Yezin, establish new programmes on selected crops, carry forward the findings for adaptive trials on ARD (Applied Research Division) farms, organise extension demonstrations on farmers' fields and initiate development programmes on selected crops including jute and food legumes.

The immediate objectives of the project are as follows:

1. Carry out a programme of varietal introduction, selection and testing in order to develop high yielding and better quality varieties of wheat, maize, sugarcane, sunflower and groundnut.

2. Evolve better crop management practices including plant protection measures for realising high yields from the improved crop varieties.

3. Carry out laboratory and pilot scale technological evaluation of quality of oilseeds, sugarcane and cereal crops (eg. wheat and maize) and establish and improve facilities to this effect.

4. Carry out adaptive research on project crops, develop better cropping patterns for different ecological zones and strengthen the facilities at select ARD farms (Henzada, Layhtatpyin, Nyaungbintha and Zoloke) to this effect.

5. Carry out farmers' field trials and model plot demonstrations and conduct package programmes through strengthened extension activities at the grass-root level and thereby promote development of wheat, maize, sugarcane, sunflower, groundnut, jute and food legumes.

6. Train research and development staff, as required in the above fields through in-service and fellowship training.

C. Special Considerations

Not applicable.

D. Background and Justification

1. Background Information

Agricultural development constitutes the major thrust in the national economic development programmes of Burma. The objectives of the twenty-year long term plan (1973-74 to 1993-94) for the agricultural sector are the following:

a. attain self sufficiency in all food crops,
b. produce adequate raw materials for the national industries, and
c. promote the export potential of the various agricultural products.

During the current third four year plan (1978-79 to 1981-82) the Government have set up targets for increasing the yield per unit area and total production of important field food and agricultural raw material crops.

In respect of the crops proposed for improvement and development under this project, the present yield levels are generally low as compared to some of the neighbouring countries in the region (vide table below).

Yield in kg/ha (1975)*

Crop	Country			
	Burma	Thailand	China	India
Wheat	745	-	1,367	1,338
Maize	820	2,542	3,000	903
Sugarcane (ton/ha)	33.3	52.1	70.5	50.6
Sunflower	376	-	1,280	-
Groundnut (in shell)	718	2,167	1,279	917
Jute	856	1,286	3,320	1,369

* FAO Production Yearbook, 1975

The targets set up by the Government of the Socialist Republic of the Union of Burma for yield increase in respect of these crops during the third four-year plan are reported as follows:

Yield in kg/ha

	1978-79	1981-82
Wheat	1,306	1,532
Maize	1,472	1,663
Sugarcane (tons/ha)	50.4	65.7
Sunflower	566	688
Groundnut (in shell)	906	1,372
Jute fibre	1,015	1,186

The proposed project activities will contribute to technical innovations and development of these crops for yield advance.

Next to rice, maize and wheat constitute the most important cereal food grain source in Burma with an estimated annual harvested area of 175,000 hectares under maize and 85,000 hectares under wheat. During 1975 a production of 75,000 tonnes of maize and 65,000 tonnes of wheat was reported. The national production of wheat is not enough for local consumption and both unmilled wheat and wheat flour are being imported in quantities ranging upto 20,000 tonnes annually. Wheat usually follows an early monsoon crop of sesamum, maize or monsoon fallow and is largely confined to the Sagaing and Mandalay divisions and the Shan States.

Bulk of the maize crop is grown during the monsoon season with only about 10-15 percent being planted in winter. Maize husk is used as wrapper for local cigars and in many tracts the maize farmer realises as much income from husk as from grain. Hence husk quality

(length, smoothness etc.) and number are important criteria for acceptance of new varieties in Burma. Government plans for increasing maize production are intended for larger export of grain and also for use as livestock feed. Vertical improvement, better management and plant protection techniques can lead to significant increase in maize yields.

Sugarcane is one of the most important industrial crops in Burma with a normal planted area of 40,000 hectares every year, intended to provide raw material for six sugar mills with an installed crushing capacity of over 6,000 tons per day. Five main varieties of cane, CO 419, CO 1001, CO 775, Taiwan 134 and POJ 3016 are used for planting and the sugarcane area is mainly confined to the Mandalay and Pegu divisions. The average yield of cane is 35 tonnes/ha (matured area) and the sugar recovery is around 9 percent only which are both low. There is good scope for improving cane yields and sugar per unit area by intensified research and development.

Sunflower is a new oilseed crop to Burma although small areas under the edible type have been grown in the Shan States since the midsixties. With the introduction of 'oil' types in 1974-75 the expansion of area under sunflower has been rapid with an estimated area of 32,000 hectares in 1977-78. Introduced varieties Smerna and Perendovik-66 are now grown both in the monsoon season (sown in May) and as a winter crop (sown in October). The yields are low due to poor seed setting and lack of improved technology.

Groundnut is one of the most important traditional oilseed crops with an area of nearly 700,000 hectares distributed largely in the Magwe, Mandalay and Sagaing divisions in Upper Burma and the Pegu and Irrawaddy divisions in Lower Burma. It is grown both as a monsoon and winter season crop. Erect as well as spreading types are cultivated. Lack of fertilizer use and Rhizobial inoculum, poor seed storage and low viability, moisture stress and gappy field stand of plants limit groundnut yields in the country.

With an average area of nearly 100,000 hectares the jute crop is largely confined to the Irrawaddy, Pegu and Rangoon divisions. With supply of improved seed and better management practices the export potential of raw jute can be increased.

2. Justification

The crop improvement programmes developed under the UNDP/FAO assisted Project BUR/72/003 during 1975-1978 have demonstrated that the yield and quality of rice, cotton, food legumes, jute etc. can be improved through new varieties and better management practices. The work initiated during 1978 on maize and sugarcane has indicated within a short time, distinct possibilities for similar improvement if the programme is continued on those crops. Other important crops identified for specific improvement and development in the new project are wheat, sunflower and groundnut, apart from a field extension programme on jute and food legumes based on results from the BUR/72/003 project.

E. Outputs

The present project is designed to establish an integrated approach for crop develop-

ment, with initial and basic work at the ARI Yezin, adaptive and regional research at the ARI farms and extension demonstrations and package programmes on farmers' fields. Thus national research programmes on important cereal, oilseed and sugar crops will be strengthened and a close link between research and extension will be established.

The specific outputs are as follows:

1. New improved varieties with better yield and quality in wheat, maize, sugarcane, sunflower and groundnut.

2. Better cultural management and plant protection measures for the new crop varieties.

3. Results of technological evaluation of cereal, oilseed and sugarcane crop quality.

4. Results from field trials on new crop varieties and their seasonal and regional adaptability.

5. Results from model demonstration plots (5 to 10 acres each) and package programmes on farmers' fields (5,000 acre blocks) and information on production and income potential of selected crop varieties, leading to recommendations on feasibility for further large scale extension of new crop varieties and their areas of adaptation maximum productivity.

6. Adequately trained staff to continue crop development activities on completion of project (see p. 10/11).

The above outputs will be produced in successive crop seasons during project duration.

F. *Activities*

	Description of activity	Tentative timing (Starting & Completion)
1.	Prepare list of equipment and place orders	January 1979 and to continue through 1982
2.	Prepare comprehensive programme for varietal improvement, cultural management and crop protection.	January - February 1979
3.	Carry out trials at ARI with newly imported varieties of sugarcane and maize, carry out regional evaluation of the germplasm, advance the breeding programme initiated in 1978 under BUR/72/003 and conduct agronomic studies.	February 1979 and to continue through 1980

4.	Organise Annual Workshop meeting to formulate details of specific experiments to be carried out at ARI and ARD farms.	April 1979; April 1980; April 1981; April 1982
5.	Carry out varietal trials, cultural management and plant protection experiments for all project crops.	May – June 1979 and to continue in successive crop seasons through 1982.
6.	Carry out trials on farmers' fields with new crop varieties developed under BUR/72/003 and to be developed under the project.	May – June 1979 and to continue in successive crop seasons through 1982.
7.	Carry out model demonstrations adopting improved technology.	May – June 1979 and to continue in successive crop seasons through 1982.
8.	Conduct package programmes for crop development in selected townships on area basis.	May – June 1979 and to continue in successive crop seasons through 1982.
9.	Organise training courses for research and development staff.	June 1979 & January 1980, through 1982.

G. Inputs

1. Government Inputs

	Total cost for 4 years (Kyats)
	12,728,400

a. National Staff

Staff at ARI, Yezin, ARD farms and Extension Division as indicated in Budget Statement.

(i) General Manager, ARI Yezin (Counterpart of the Team Leader): in charge of planning, implementation and coordination of the project activities in collaboration with the Team leader.

(ii) Dy. General Manager

The General Crops, Sugarcane, Sunflower and Groundnut Specialists will be assigned counterparts (4) of the rank of Dy. General Manager with the following job description; He will collaborate with the Experts in developing a research programme,

organize adaptive trials in the Applied Research Division farms and extension demonstrations on farmers' fields in cooperation with the ARD and Extention division.

(iii) Dy. Asst. General Manager

For each of the Crops at least one Dy. Asst. General Manager will be assigned to provide support in implementing the programme.

(iv) Junior Research Officer

For each crop at least two Junior Research officers will be assigned to provide field and laboratory assistance in carrying out the programme.

(v) Supporting administrative and clerical staff as well as labour.

b.	Fellowships	782,340
	Subsistence and local travel for fellows and in-service trainees.	
c.	Expendable Equipment	630,000
	Seed, fertilizer, pesticides, office equipment, etc.	
d.	Non-expendable equipment	3,300,000
	Locally manufactured agricultural machinery implements, vehicles, bicycles, bullocks, furniture etc.	
e.	Premises	17,300,000
	Office and Laboratory buildings	
f.	Miscellaneous	
	(i) Operation and maintenance of equipment; cultivation costs	1,580,000
	(ii) Sundry	255,000

2. UNDP Financed Inputs*

a. Experts and Consultants**

	Location	Starting date	Duration
One of the Experts will function as Team leader and will collaborate in planning, coordination and implementation of the work programme, with the General Manager, ARI Yezin (National Project Coordiantor)**			
1) General Crops Specialist	Yezin	January 1979	24 m/m
He will identify better varieties of maize and crop management techniques based on current programme in progress.			
He will initiate a wheat improvement programme through introduction of high yielding varieties, carry out adaptability trials and develop cultural management practices for increasing yields. He will also initiate a seed multiplication programme for the new promising varieties.			
2) Sugarcane Specialist	Yezin	January 1979	24 m/m
He will accelerate sugarcane development through the introduction of new varieties, continue the breeding programme, improve crop performance with better cultural practices, establish a small sugarcane laboratory and develop strategies for improving sugar recovery.			
3) Sunflower Specialist	Yezin	January 1979	30 m/m
He will carry out a large scale programme of introduction of new varieties, organise regional testing, undertake agronomic studies with promising varieties and hybrids and also assist the sunflower development programme initiated by the Extension division.			

4)	Groundnut Specialist	Yezin	January 1980	30 m/m
	He will be responsible for developing a groundnut improvement programme based on varietal introduction and testing, improved agronomic management practices, pest and disease control and carry out farmers' field trials and demonstrations in collaboration with the Extension division.			
5)	Consultants	Yezin	–	32 m/m
	(Short term for Groundnut genetics, Sesamum breeding, Jute development, Rhizobium culture, Agricultural economics etc. and as required.)			

b. Training**

		Location (Countries with alternatives)	Duration and Timing (m/m)	
i)	Fellowships			
	Wheat breeding/agronomy	Mexico/Australia	12	1979–80
	Maize breeding	Mexico/U.S.A.	6	1979
	Sugarcane breeding/agronomy	Australia/ Mauritius/India	12	1980
	Sunflower breeding/agronomy	Australia/U.S.A.	6	1980
	Groundnut breeding/agronomy	U.S.A./India	12	1980
	Sesamum breeding/agronomy	Israel/India	12	1981
	Irrigation agronomy	Israel/Sudan	6	1981
	Agro-economics	India/Philippines	6	1981
	Entomology	U.K./Australia	6	1982
	Micro-biology	U.S.A./Australia	6	1982
	Radio-isotope technology	Netherland/India	6	1982
	Plant physiology	Japan/Australia	6	1982
	Agricultural meteorology	U.K./India	6	1980
	Others as required	–	18	(1980–82)
ii)	Group training and International seminars and meetings	–	20	

Note: * The office of the FAO Representative in Rangoon will handle administrative matters pertaining to UNDP financed inputs.

** 1. Fellowship man-months may be suitably re-allocated to permit candidates for post-graduate degree programme in selected fields, as required.

2. As a principle the Fellows will spend at least one or two crop seasons with the Expert.

c. UNDP Provided Equipment and Supplies

The equipment and supplies needed within the framework of the present project will be primarily used for the development of the new crops i.e. it is complementary to the equipment already provided under the BUR/72/003 project which will also be available for this project. The project equipment will be utilised in three different divisions of the Agriculture Corporation viz., ARI Yezin, (basic and initial research), the four ARD farms (Applied and adaptive research) and the Extension division (seven Agricultural divisions, for field trials, model demonstration plots and as required for package programmes).

At the preceding locations the coverage will be as follows:

ARI Yezin = 250 acres
ARD farms = 500 acres (125 acres for each farm)
Extension = 5 to 10 acres per demonstration plot (initial number envisaged 50 plots per year).

1. Expendable Equipment
(for 4 years)

(U.S.$ in thousands)

	Total	A.R.I. Yezin	A.R.D. Farms (4)	Extension Division (7) *
Seeds	75	5	20	50
Insecticides	50	5	20	25
Fungicides	20	5	10	5
Herbicide	20	5	10	5
Fertilizers	40	10	20	10
Laboratory Chemicals	30	25	5	-
Glassware	35	25	10	-
Photographic material	15	5	5	5
Duplicating paper	30	10	15	5
Miscellaneous	45	10	10	25
Total	360	105	125	130

* Inputs primarily for model demonstration plots.

2. Non-expendable Equipment

i) Farm Equipment and Machinery

Item	Unit price ($)	Total cost in U.S.$ (thousand)			
		Total	ARI Yezin	ARD farms (4)	Extension Division (7)
Tractor with cultivation machinery	15,000	165	45	120	-
Power generating set	15,000	75	15	60	-
Air compressor with oil engine	7,500	100	15	30	55
Power sprayers and dusters	750	85	10	25	50
Weigh bridge	3,500	30	15	15	-
Platform scale	1,000	20	5	5	10
Balances	500	175	25	50	100
Water pumping set with engine	12,500	175	25	50	100
Other field equipment as required	-	15	10	5	-
Total		685	145	315	225
Add 10 percent for Insurance and freight and 10 percent for cost increase		137			
Total		822			

ii) Special Laboratory Equipment

Item	U.S.$ (thousand)		
	Total	ARI Yezin	ARD farms (4)
Oilseeds Division	55	50	5
Pilot oil expeller, non-destructive estimation of oil content (NMR instrument), electronic seed counter, cool incubator.			
Cereal Crops Division	30	25	5
Laboratory mill, germinator, seed counter, drying oven, seed cleaner and grader, incubator.			
Sugarcane Division	30	25	5
Power crusher, sugar analysis equipment, deep freezer, autoclave, analytical balance.			
Entomology	25	20	5
Insectary fittings, equipment for bio-chemical assay, precision balances, dissecting microscopes			
Pathology	25	20	5
Sterilization equipment, microscopes, temperature controlled culture cabinets.			
Common Facilities	40	40	-
Laboratory fittings, glasshouse fittings, air-conditioners, de-humidifiers, growth cabinets.			
Meteorological instruments	20	10	10
Miscellaneous items	25	10	15
Total	250	200	50

iii) Audio-visual Equipment

Item	U.S.$ (thousand)			
	Total	ARI Yezin	ARD farms (4)	Extension Division (7)
Camera	7	1	2	4
Projectors (slide/overhead)	9	1	4	4
Duplicator	14	2	4	8
Printing press	15	15	-	-
Miscellaneous	10	3	3	4
Total	55	22	13	20

iv) Office Equipment
including typewriters, calculating machines and photo-copier

30	10	10	10

v) Library Books and Periodicals

75	50	20	5

Total cost of UNDP
financed equipment and supplies:

Expendable items	360	U.S.$ (thousand)
Non-expendable equipment	1,425	

d. Miscellaneous

		U.S.$
1.	Operation and maintenance of equipment (10% of cost)	143,000
2.	Reporting costs	5,000
3.	Sundry	25,000

H. Preparation of Work Plan

The main work components and estimated timing and duration are indicated in Section F.

A detailed Work Plan for the implementation of the project will be prepared by the Team Leader in consultation with the National Project Coordinator at the start of the project and brought forward periodically.

I. Framework for Effective Participation

The activities necessary to produce the indicated outputs and achieve the project's immediate objective will be carried out jointly by the national and international staff assigned to it. The respective roles of the national and international staff will be determined by their leaders, by mutual discussion and agreement, at the beginning of the proejct.

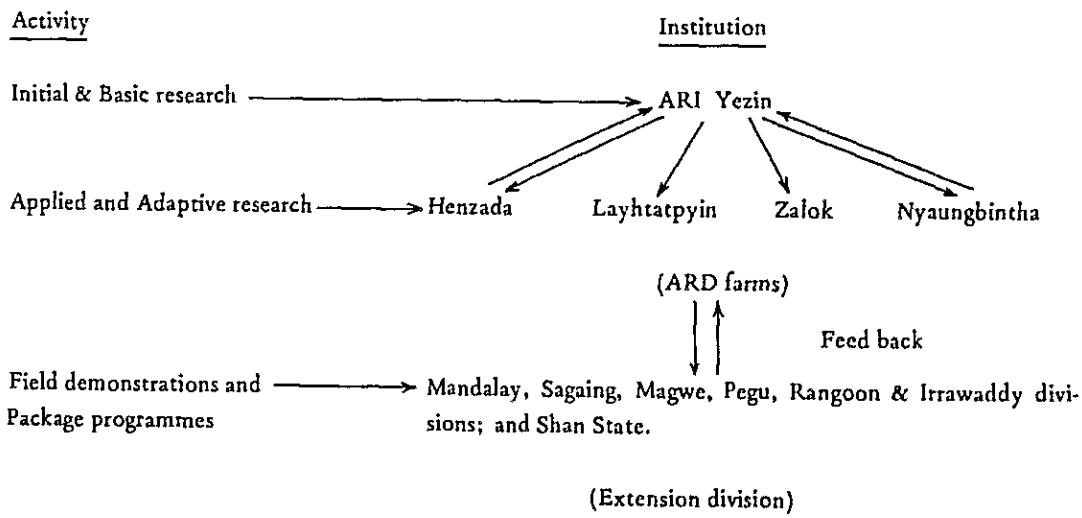
J. Development Support Communication

The project findings will be reported periodically and the Extension Division will arrange to disseminate the information through leaflets, radio broadcasts and farmers' meetings.

K. Institutional Framework and Related Activities

The implementation of the proejct would primarily involve the Agricultural Research Institute, Yezin which will function as the National Counterpart Agency for the project activities. A close link up with the Applied Research Division farms and the Extension Division for transferring the new technology to the farmers' fields is a special feature of the proejct (see chart).

Institutional Frame-work for Project Implementation



The ARD farms at Henzada (for groundnut), Layhtatpyin (for sunflower), Zolok (for wheat) and Nyaung-bin-tha (for sugarcane) will be developed under the proejct to provide the main out-reach support, apart from other established farms.

The field development of project crops will be carried out by the Extension Division mainly in the Mandalay, Sagaing, Magwe, Pegu, Irrawaddy and Rangoon divisions and the Shan State.

The ARI Yezin has a total scientific staff of 72 persons ranging from Junior Research Officers to General Manager and an additional strength of 42 scientific staff are foreseen under this project. Necessary staff support in ARD farms and Extension Division will be provided for project activities. Adequate supporting administrative and clerical staff as well as farm labour are also available.

The IDA assisted Seed Development Project ($11.0 million including $5.5 million foreign exchange, 1977-82) and the relevant Technical Assistance Project BUR/77/008 ($975,000, 1978-81) would establish among others, a pilot storage project for groundnut seed in lower Burma and also an applied research programme for this crop.

This project will assist the Government of the Socialist Republic of the Union of Burma in:

(a) developing an applied agricultural research programme within ARD for, inter alia, rice, cotton seed and groundnuts and developing the capacity to execute such a Programme;

(b) initiating seed multiplication and distribution programmes for rice and cotton which would lay the foundation for subsequent expansion of the seed industry;

(c) planning and supervising the development of six applied research/seed farms;

(d) establishing the feasibility of groundnut storage in Lower Burma through a pilot storage project;

(e) identifying specific ARD staff training requirements and those institutions overseas capable of providing the necessary training; and

(f) providing on-the-job training in farm development, farm management, seed production, processing, storage and distribution and applied research, through formal short courses and "learning by doing".

The Seed Project activities will be centered in the six ARD farms at Mandalay, Hmawbi, Letpadan, Magwe, Mahlaing and Lungyaw, whereas the Crop Development Project (BUR/77/009) is complementary in developing Henzada, Layhtatpyin, Zaloke and Nyaungbintha farms.

A Project Coordination Committee with the General Managers of ARI Yezin, ARD and Extension Division as members under the chairmanship of the Managing Director of the Agriculture Corporation would be constituted to ensure effective coordination in the implementation of project activities and for close liaison with the Seed Project and other relevant activities.

The present Project would also establish close links with selected International Agricultural Institutes relevant to the crops included in the programme and participate in International Varietal Testing Programmes and utilise the training facilities offered by these Institutes. The ICRISAT, Hyderabad (India) for groundnut, the CIMMYT, Mexico for maize and wheat, the European Sunflower network sponsored by the FAO and the National Sugarcane Breeding Institute, Coimbatore (India) are expected to cooperate in the project activities.

L. Prior Obligations and Pre-Requisites

None

M. Future UNDP Assistance

The project is investment oriented. Future UNDP assistance will be considered in the light of results obtained under the present project.

PART III. SCHEDULE OF MONITORING, EVALUATION AND REPORTS

A. Tripartite Monitoring Reviews: Technical Reviews

The project will be subject to periodic review in accordance with the policies and procedures established by the UNDP for monitoring project and programme implementation.

A mid-term technical review of the project will be undertaken by the Executive Agency.

B. Evaluation

The project will be subject to evaluation in accordance with the policies and procedures established for this purpose by the UNDP. The organization, terms of reference and timing of the evaluation will be decided by consultation between the Government, UNDP and the Executing Agency.

C. Progress and Terminal Reports

The reporting schedule would be as follows:

Six-monthly Progress Report to the UNDP

July	1979
January	1980
July	1980
January	1981
July	1981
January	1982
July	1982

Project Terminal Report

November 1982

PART IV. BUDGETS

The UNDP and Government budgets for the entire project are indicated in the following Statements A & B:

The estimated total contributions are

UNDP	US$	2,901,844	
Government	Kyats	32,645,740	(in kind)

A. Project Budget Covering UNDP Contribution (in US Dollars)

Country: The Socialist Republic of the Union of Burma
Project No.: BUR/77/009/A/01/12
Title: Crop Development in Burma

		Total		1979		1980		1981		1982	
		m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
10	PROJECT PERSONNEL										
11	Experts										
11.01	Cereal Crops Specialist	24	107,040	12	51,480	12	55,560		-		-
11.02	Sugarcane Specialist	24	107,040	12	51,480	12	55,560		-		-
11.03	Sunflower Specialist	30	137,040	12	51,480	12	55,560	6	30,000		-
11.04	Groundnut Specialist	30	152,580	-	-	6	27,780	12	60,000	12	64,800
11.05	Additional Salary for Team Leader		30,144		6,720		7,200		7,800		8,424
11.06	Consultants (Jute, Seasamum, Agricultural Economics & as required)	32	112,000	8	28,000	8	28,000	8	28,000	8	28,000
11.99	Sub-total	140	645,844	44	189,160	50	229,660	26	125,800	20	101,224
13	Administrative Support Personnel		50,000		12,500		12,500		12,500		12,500
15	Official Travel		20,000		5,000		5,000		5,000		5,000
16	Other Costs		10,000		2,500		2,500		2,500		2,500
19	Component Total		725,844		209,160		249,660		145,800		121,224
30	TRAINING										
31	Fellowships	120	168,000	24	33,600	36	50,400	36	50,400	24	33,600
32	Group Training (Group Study Tours, International Seminars)	20	50,000	2	5,000	8	20,000	8	20,000	2	5,000
39	Component Total	140	218,000	26	38,600	44	70,400	44	70,400	26	38,600

40	ÉQUIPMENT					
41	Expendable Equipment	360,000	60,000	100,000	100,000	100,000
42	Non Expendable Equipment	1,425,000	300,000	400,000	425,000	300,000
49	Component Total	1,785,000	360,000	500,000	525,000	400,000
50	MISCELLANEOUS					
59	Component Total	173,000	40,000	45,000	45,000	43,000
99	GRAND TOTAL	2,901,844	647,760	865,060	786,200	602,824

B. Project Budget Covering Government Contribution (in Kyats)

Country: The Socialist Republic of the Union of Burma
Project No.: BUR/77/009/A/01/12
Title: Crop Development in Burma

		Total		1979		1980		1981		1982	
		mm	Ks.	mm	Ks.	mm	Ks.	mm	Ks.	mm	Ks.
10	PROJECT PERSONNEL										
	Staff at the										
	ARI Yezin	-	1,469,520	-	339,300	-	358,020	-	376,740	-	395,460
	A.R.D. Farms	-	2,580,000	-	645,000	-	645,000	-	645,000	-	645,000
	Extension Division	-	8,678,880	-	2,169,720	-	2,169,720	-	2,169,720	-	2,169,720
19	Component Total	-	12,728,400	3,154,020		-	3,172,740	-	3,191,460	-	3,210,180
30	TRAINING										
33	In-service Training										
	ARI Yezin (Subsistence & Local Travel)		519,840		129,960		129,960		129,960		129,960
	Extension Division		262,500		65,625		65,625		65,625		65,625
39	Component Total		782,340		195,585		195,585		195,585		195,585
40	EQUIPMENT										
41	Expendable Equipment										
	ARI Yezin		40,000		10,000		10,000		10,000		10,000
	A.R.D. Farms		100,000		25,000		25,000		25,000		25,000
	Extension Division		490,000		122,500		122,500		122,500		122,500
42	Non Expendable Equipment										
	ARI Yezin		1,305,500		295,000		586,200		224,300		200,000

		A.R.D. Farms	3,664,800	791,200	1,051,200	946,200	876,200
		Extension Division	948,500	271,000	539,800	56,700	81,000
	43	Premises					
		ARI Yezin	8,551,200	1,651,200	3,650,000	3,250,000	-
		A.R.D. Farms	2,200,000	700,000	800,000	700,000	-
	49	Component Total	17,300,000	3,865,900	6,784,700	5,334,700	1,314,700
50		MISCELLANEOUS					
	51	Operation & Maintenance Cost					
		ARI Yezin	700,000	175,000	175,000	175,000	175,000
		A.R.D. Farms	600,000	150,000	150,000	150,000	150,000
		Extension Division	280,000	70,000	70,000	70,000	70,000
	53	Sundry					
		ARI Yezin	100,000	25,000	25,000	25,000	25,000
		A.R.D. Farms	120,000	30,000	30,000	30,000	30,000
		Extension Division	35,000	8,000	9,000	9,000	9,000
	59	Component Total	1,835,000	458,000	459,000	459,000	459,000
99		GRAND TOTAL	32,645,740	7,673,505	10,612,025	9,180,745	5,179,465

ANNEX I

ORGANISATION OF THE PROJECT

1. Pending finalisation of the new consolidated Standard Agreement with Governments, the following standard text is to be appended to all project documents:

General Responsibilities

2. The Government, the UNDP and the Executing Agency shall jointly be responsible for the execution of the project and the realisation of its objectives as described in Part II of this Project Document.

3. The Government shall provide to the project the national project personnel, training facilities, land, building, equipment and other required services and facilities. It will designate the Government Co-operating Agency named in the cover page of this document, which will hereinafter be referred to as the "Co-operating Agency" and which will be directly responsible for the implementation of the Government contribution to the project.

4. The UNDP undertakes to complement and supplement the Government participation and will provide through the Executing Agency the required expert services, training, equipment and other services within the funds available to the proejct.

5. Upon commencement of the project the Executing Agency may be requested to assume primary responsibility for project execution. However, that primary responsibility shall be exercised in consultation and in agreement with the Co-operating Agency. Arrangements to this effect shall be stipulated in the project Work Plan as well as for the transfer of this responsibility to the Government or to an entity designated by the Government during the execution of the project.

6. Part of the Government's participation may take the form of a cash contribution to UNDP. In such cases, the Executing Agency will provide the related services and facilities and will account annually to the UNDP and to the Government for the expenditure incurred.

Participation of the Government

7. The Government shall provide to the project the services, equipment and facilities in the quantities and at the times specified in the Work Plan. Budgetary provision – either in kind or in cash – for the Government's participation so specified shall be set forth in the Project Budgets.

8. The Co-operating Agency shall in consultation with the Executing Agency assign a director for the project on a full-time basis. He shall carry out such responsibilities in the project as are assigned to him by the Co-operating Agency.

9. The estimated cost of items included in the Government contribution, as detailed in the Project Budget, shall be based on the best information available at the time of drafting this project proposal. It is understood that price fluctuations during the period of execution of the project may necessitate an adjustment of said contribution in monetary terms; the latter shall at all times be determined by the value of the services, equipment and facilities required for the proper execution of the project.

10. Within the given number of man-months of personnel services described in the Work Plan minor adjustments of individual assignments of project personnel provided by the Government may be made by the Government in consultation with the Executing Agency, if this is found to be in the best interests of the project.

11. The Government shall continue to pay the local salaries and appropriate allowances of national project personnel during the period of their absence from the project while on UNDP fellowships.

12. The Government shall defray any customs duties, and pay other charges related to the clearance of project equipment, its transportation, handling, storage and related expenses within the country. It shall be responsible for safe custody of the equipment, its installation and maintenance, insurance and replacement if necessary, after delivery to the project site.

13. The Government shall make available to the project - subject to existing security provisions - any published and unpublished reports, maps, records and other data which are considered necessary to the implementation of the project.

14. The Government shall assist all project personnel in finding suitable housing accommodation at reasonable rents.

15. The services and facilities specified in the Work Plan which are to be provided to the project by the Government by means of a contribution in cash shall be set forth in the Project Budget. Payment of this amount shall be made in local currency to the UNDP in accordance with the Schedule of Payments by the Government.

16. Payment of the above-mentioned contribution to the UNDP on or before the dates specified in the Schedule of Payments by the Government is a pre-requisite to commencement or continuation of project operation.

Participation of the UNDP and of the Executing Agency

17. The UNDP shall provide to the project through the Executing Agency the services, equipment and facilities described in the Work Plan. Budgetary provision for the UNDP contribution as specified shall be set forth in the Project Budget.

18. The Executing Agency shall consult with the Government on the candidature of the Project Manager* who, under the direction of the Executing Agency, will be responsible in the

* May also be designated Team Leader or Chief Technical Adviser, as appropriate.

country for the Executing Agency's participation in the project. The Project Manager shall supervise the experts and other agency personnel assigned to the project, and the on-the-job training of national project personnel. He shall be responsible for the management of all equipment provided to the project from UNDP funds.

19. The Executing Agency, in consultation with the Government, shall assign international staff and other personnel to the project as specified in the Work Plan, select candidates for fellowships and determine standards for the training of national project personnel.

20. Fellowships shall be administered in accordance with the fellowships regulations of the Executing Agency.

21. The Executing Agency may, in agreement with the Government and UNDP, execute part or all of the project by sub-contract. The selection of sub-contractors shall be made, after consultation with the Government, in accordance with the Executing Agency's procedures.

22. All material, equipment and supplies which are purchased from UNDP resources will be used exclusively for the execution of the project, and will remain the property of the UNDP in whose name it will be held by the Executing Agency. Equipment supplied by the UNDP shall be marked with the insignia of the UNDP and of the Executing Agency.

23. Arrangements may be made, if necessary, for a temporary transfer of custody of equipment to local authorities during the lifetime of the project, without prejudice to the final transfer.

24. Prior to completion of UNDP assistance to the project, the Government, the UNDP and the Executing Agency shall consult as to the disposition of all project equipment provided by the UNDP. Title to such equipment shall normally be transferred to the Government, or to an entity nominated by the Government, when it is required for continued operation of the project or for activities following directly therefrom. The UNDP may, however, at its discretion, retain title to part or all of such equipment.

25. At an agreed time after the completion of UNDP assistance to the project, the Government and the UNDP, and if necessary the Executing Agency, shall review the activities continuing from or consequent upon the project with a view to evaluating its results.

Facilities, Privileges and Immunities

UNDP and Executing Agency Personnel

26. In accordance with the Agreement concluded by UNDP and the Government concerning the provision of assistance, the personnel of UNDP and other United Nations organizations associated with the project, shall be accorded facilities, privileges and immunities specified in the said Agreement.

Sub-contractors and Their Personnel

27. The Executing Agency's contractors and their personnel (except Government nationals employed locally) shall;

(a) Be immune from legal process in respect of all acts performed by them in their official capacity in the execution of the project,

(b) be immune from national service obligations,

(c) be immune, together with their spouses and relatives dependent on them from immigration restrictions,

(d) be accorded the privileges of bringing into the country reasonable amounts of foreign currency for the purposes of the project or for personal use of such personnel, and of withdrawing any such amounts brought into the country, or in accordance with the relevant foreign exchange regulations, such amounts as may be earned therein by such personnel in the execution of the project,

(e) be accorded together with their spouses and relatives dependent on them the same repatriation facilities in the event of international crisis as diplomatic envoys.

28. All personnel of the Executing Agency's contractors shall enjoy inviolability for all papers and documents relating to the project.

29. The Government shall either exempt from, or bear the cost of any taxes, duties, fees or levies which it may impose on any foreign firm or organization which may be retained by the Executing Agency and on the foreign personnel of any such firm or organization in respect of:

(a) The salaries or wages earned by such personnel in the execution of the project,

(b) Any equipment, materials and supplies brought into the country for the purposes of the project or which. after having been brought into the country, may be subsequently withdrawn therefrom,

(c) Any substantial quantities of equipment, materials and supplies obtained locally for the execution of the project, such as, for example, petrol and spare parts for the operation and maintenance of equipment mentioned under (b) above, with the provision that the types and approximate quantities to be exempted and relevant procedures to be followed shall be agreed upon with the Government and, as appropriate, recorded in the Work plan, and

(d) As in the case of concessions currently granted to UNDP and Executing Agency's personnel, any property brought, including one privately owned automobile per employee, by the firm or organization or its personnel for their personal use or

consumption or which after having been brought into the country, may subsequently be withdrawn therefrom upon departure of such personnel.

30. The privileges and immunities to which such firm or organization and its personnel may be entitled, referred to in the paragraphs above, may be waived by the Executing Agency where, in its opinion or in the opinion of the UNDP, the immunity would impede the course of justice and can be waived without prejudice to the successful completion of the project or to the interest of the UNDP or the Executing Agency.

31. The Executing Agency shall provide the Government through the Resident Representative with the list of personnel to whom the privileges and immunities enumerated above shall apply.

資 料V. ACTIVITIES AND PROGRAMME OF AGRICULTURAL RESEARCH DIVISION

(1977 – 1978)

AGRICULTURE CORPORATION
Ministry of Agriculture and Forests

There are 16 Central Farms under ARD with 971 acres of Paddy Land, 2,914 acres of upland and 4,048 acres of other land including uncultivable acres. There are 53 officers and 264 other staff members working at the Central Farms.

Besides these Central Farms, there are also 56 Seed Farms with 2,148 acres of Paddy Land, 4,218 acres of upland and 7,147 acres of other land managed by 12 officers and 113 other ranks.

To control the Agricultural Research Division, General Manager (Research) is assisted by 11 officers and 58 other staff members.

The main activities of the Research Division can be summarised as follows:

(1) Breeding and selection of important crops.
(2) Testing the yielding ability of promising strains and varieties.
(3) Conducting cultural experiments, such as testing of better cultural methods of crop.
(4) Conducting fertilizer experiments, such as testing of different doses of fertilizers on crops.
(5) Production and distribution of pure seeds.
(6) Conducting training courses for cultivators and departmental staff members.

CENTRAL FARMS

(1) Breeding and Selection Works

The following crops are under selection at the respective Central Farms:

	Central Farms	Crops	Varieties/Strains
(a)	Mandalay	Paddy (Lowland)	180
		Wheat	88
(b)	Mahlaing	Cotton (Long staple)	63
		Cotton (Short staple)	113
		Butter Beans	28
		Sultani	11
(c)	Hlaingdet.	Cotton (Long staple)	118
(d)	Pyinmana	Sugarcane	115
(e)	Magwe	Groundnut (Erect)	137
		Groundnut (Spreading)	115
		Sesamum (Early)	93
		Sesamum (Late)	10
		Mat-pe	5
(f)	Hmawbi	Paddy	82
(g)	Myaungmya	Paddy	80
		Mat-pe	5
(h)	Mudon	Paddy	71
(i)	Akyab	Paddy	104
(j)	Pa-an	Paddy	25
(k)	Banyin	Paddy (Lowland)	47
		Paddy (Upland)	174
		Wheat	518
		Soybean	31
(l)	Nankwe (Myitkyina)	Paddy (Upland)	116

(2) (i) Yield Tests and Other Experiments (Farm-Wise)

The following yield tests and other experiments are conducted at respective Central Farms:

Farm	Crop	No. of Yield Tests	No. of Experiments				Total
			Cultural Practice	Ferti-lizer	Pest & Disease	Weedi-cide	
(a) Mandalay	Paddy	8	1	1	-	1	11
	Wheat	-	1	3	-	4	8
(b) Kyaukse	Paddy	-	1	-	-	-	1
(c) Mahlaing	Cotton (Short staple)	3	1	1	1	-	6
	Butter Beans	1	1	1	-	-	3
	Pigeon Pea	1	1	-	-	-	2
(d) Hlaingdet	Cotton (Long staple)	3	3	3	4	-	13
(e) Tatkon	Maize	-	1	1	-	1	3
	Sunflower	-	1	1	-	-	2
(f) Pyinmana	Sungarcane	2	2	1	3	1	9
(g) Magwe	Groundnut	5	8	2	3	2	20
	Sesamum	1	-	-	-	-	1
(h) Hmawbi	Paddy	10	-	-	2	1	13
(i) Myaungmya	Paddy	3	1	1	1	-	6
(j) Mudon	Paddy	3	-	-	-	-	3
(k) Banyin	Paddy	4	1	-	-	1	6
	Maize	-	-	-	-	1	1
	Groundnut	-	-	1	-	1	2
	Soybean	-	1	-	-	-	1
(l) Nankwe (Myitkyina)	Paddy	-	-	-	-	1	1
	Sugareane	1	1	1	-	1	4
Total		45	25	17	14	15	116

(ii) Yield Tests and Other Experiments (Crop-Wise)

The following crop wise yield tests and other experiments are conducted at respective farms:

Crop	Farm	No. of Yield Tests	No. of Experiments				Total
			Cultural Practice	Ferti-lizer	Pest & Disease	Weedi-cide	
(a) Paddy	Mandalay	8	1	1	-	1	11
	Kyaukse	-	1	-	-	-	1
	Hmawbi	10	-	-	2	1	13
	Myaungmya	3	1	1	1	-	6
	Mudon	3	-	-	-	-	3
	Banyin	4	1	-	-	1	6
	Nankwe (Myitkyina)	-	-	-	-	1	1
	Total	28	4	2	3	4	41
(b) Wheat	Mandalay	-	1	3	-	4	8
(c) Maize	Tatkon	-	1	1	-	1	3
	Banyin	-	-	-	-	1	1
	Total	-	2	4	-	6	12
(d) Cotton							
Long staple	Hlaing Det	3	3	3	4	-	13
Short staple	Mahlaing	3	1	1	1	-	6
	Total	6	4	4	5	-	19
(e) Sugarcane	Pyinmana	2	2	1	3	1	9
	Nankwe	1	1	1	-	1	4
	Total	3	3	2	3	2	13
(f) Groundnut	Magwe	5	8	2	3	2	20
	Banyin	-	-	1	-	1	2
	Total	5	8	3	3	3	22
(g) Sesamum	Magwe	1	-	-	-	-	1
(h) Sunflower	Tatkon	-	1	1	-	-	2
(i) Soybean	Banyin	-	1	-	-	-	1
(j) Butter beans	Mahlaing	1	1	1	-	-	3
(k) Pigeon pea	Mahlaing	1	1	-	-	-	2
All Total		45	25	17	14	15	116

(3) Pure Seed Multiplication at Central Farms

Seed multiplication at Central Farms during 1977 – 70 cropping season is as follows:

Crop	Area (Acres)	Farm
(a) Paddy		
Lowland	825	Mandalay, Kyaukse, Hmawbi, Myaungmya, Mudon, Akyab, Pa-an
Upland	46	Banyin, Nankwe
(b) Wheat	53	Banyin, Bawhkwe, Ranthilo
(c) Maize	243	Tatkon, Nankwe, Banyin, Bawhkwe, Ranthilo
(d) Cotton		
Long staple	254	Mahlaing, Hlaingdet
Short staple	195	Mahlaing, Hlaingdet
(e) Sugarcane	150	Pyinmana, Nankwe
(f) Groundnut		
Erect	70	Magwe
Spreading	1	Magwe
(g) Sesamum	347	Magwe, Mahlaing, Hlaingdat, Kyaukse, Pyinmana
(h) Sunflower	96	Tatkon, Mahlaing, Hlaingdat, Banyin, Magwe
(i) Niger	21	Magwe
(j) Butter beans	50	Mahlaing
(k) Sultani	50	Mahlaing
(l) Mat-pe	23	Myaungmya
(m) Soybean	32	Banyin, Tatkon
(n) Barley	5	Banyin
(o) Other Pulses	98	Mahlaing, Hmawbi, Ranthilo

SEED FARMS

(1) Yield Tests and Other Experiments (Farm-Wise)

The following yield tests and other experiments are conducted at respective Seed Farms:

Sr. No.	Seed Farm	Crop	No. of Yield Tests	No. of Experiments				Total
				Cultural Practice	Ferti-lizer	Pest & Diseases	Weedi-cide	
1.	Heho	Paddy	9	-	-	-	3	12
		Maize	-	-	-	-	1	1
		Groundnut (Erect)	-	-	-	-	2	2
		Soybean	1	-	-	-	-	1
2.	Lunkyaw	Cotton (Long staple)	2	7	5	2	-	16
3.	Kyehmon	Cotton (Long staple)	1	-	-	-	-	1
		Pigeon-pea	2	-	-	-	-	2
4.	Pwintphyu	Cotton (Long staple)	1	-	-	-	-	1
5.	Aung Lan	Cotton (Short staple)	1	-	-	-	-	1
		Groundnut (Erect)	-	1	-	-	-	1
6.	Pantin	Sugarcane	1	-	3	-	1	5
7.	Zaloke	Wheat	-	2	1	-	-	3
8.	Thayaung-chaung	Paddy	1	1	-	-	-	2
		Total	19	11	9	2	7	48

(2) Yield Tests and Other Experiment (Crop-Wise)

The following crop wise yield tests and other experiments are conducted at respective Seed Farms:

Crop	Seed Farms	No. of Yield Test	No. of Experiments				Total
			Cultural Practice	Ferti-lizer	Pest & Diseases	Weedi-cide	
(a) Paddy	Thayaungchaung	1	1	-	-	-	2
	Heho	9	-	-	-	3	12
	Total	10	1	-	-	3	14
(b) Wheat	Zaloke	-	2	1	-	-	3
(c) Maize	Heho	-	-	-	-	1	1
(d) Cotton (Long staple)	Kyehmon	1	-	-	-	-	1
	Lung Kyaw	2	7	5	2	-	16
	Pwintphyu	1	-	-	-	-	1
	Total	4	7	5	2	-	18
Cotton (Short staple)	Aung Lan	1	-	-	-	-	1
(e) Sugarcane	Pantin	1	-	3	-	1	5
(f) Groundnut (Erect)	Aung Lan	-	1	-	-	-	1
	Heho	-	-	-	-	2	2
	Total	-	1	-	-	2	3
(g) Soybean	Heho	1	-	-	-	-	1
(h) Pigeon pea	Kyehmon	2	-	-	-	-	2
	Grand Total	19	11	9	2	7	48

(3) Pure Seed Multiplication and Distribution at Central Farms and Seed Farms (Crop-Wise)

Seed multiplication at Central Farms and Seed Farms during 1977 - 78 cropping season is as follows:

Crop	Area		Total (Acre)
	Central Farm (Acre)	Seed Farm (Acre)	
(a) Paddy			
Low land	825	1,644	2,469
Up land	46	156	202
(b) Wheat	53	173	226
(c) Maize	243	112	355
(d) Cotton			
Long staple	254	111	365
Short staple	195	116	311
(e) Sugarcane	150	2,137	2,287
(f) Groundnut			
Erect	70	99	169
Spreading	1	-	1
(g) Sesamum	347	400	747
(h) Sunflower	96	426	522
(i) Niger	21	-	21
(j) Butter-bean	50	7	57
(k) Sultani	50	55	105
(l) Mat-pe	23	70	93
(m) Soybean	32	40	72
(n) Other Pulses	98	155	253
(o) Jute	-	30	30
Total	2,554	5,731	8,285

During 1977 - 78 the following Training Courses will be carried out at the Central Farms and Seed Farms:

		No. of Training Centres	No. of Trainees
(a)	Training for Cultivators	18	3,475
(b)	Training for Army Personnels	1	200
(c)	Preservice Training	Nil	Nil
(d)	Inservice Training for Township Managers	1	900
(e)	Inservice Training for Village Tract Managers and Village Managers	11	1,920
	Total	31	6,495

資 料Ⅵ. ACTIVITIES AND PROGRAMME OF AGRICULTURAL EXPERIMENT STATION, HMAWBI

(1978 – 1979)

AGRICULTURE CORPORATION
Ministry of Agriculture and Forests

INTRODUCTION

1. Hmawbi Agricultural Experiment Station was established in the year 1908. It is situated on the Rangoon-Prome road 31 miles north of Rangoon. It's latitude is 17 degrees north and the longitude being 98 degrees east with an altitude of 88 feet above sea level.

OBJECTIVES

2. The main objectives of the experiment Station area as follows:

(a) To conduct rice varietal improvement and research work on problems related to rice production under rainfed condition in the old deltric zone of lower Burma.

(b) To produce foundation seed of improved rice varieties, both local and introduced.

(c) To disseminate the new rice production technology to the leading farmers through training at the farm training centre and to train the village level extension workers to be able to help farmers learn the new technology especially in rice production.

AREA

3. The total area of the station amounts to 454 acres, out of which building sites and orchard areas occupies upland side 54 acres on the higher ground and the remaining 400 acres were lowlying paddy land.

(a)	Upland (orchard, buildings, etc.)	54 acres
(b)	Lowland (rice fields)	400 acres
(b-1)	Foundation seed production	286 acres
(b-2)	Research area	50 acres
(b-3)	Irrigation and drainage channels	64 acres
	Total	454 acres

SOIL

4. The Soil of the rice fields is mostly clayey loam with a stiffer sub-soil overlaying at greater depth of slaty blue clay. The fields near and on the upland side are more sandy with sandy-clay sub-soil. Both types of soil dry off very rapidly after harvest and becoming hard so that growing a second crop needs irrigation for soil moisture and tractors for land preparation.

The rice field soils are fairly high in nitrogen and poor in phosphate with fair amount of potash. Most soils are acidic with the pH value of 5.5 to 6.0.

CLIMATE

5. The year consists of two distinct seasons, a wet period from May to October and a dry period from November to April, with a short cool period in December and January.

	Period	Mean Max. (F)	Mean Min. (F)
(a)	Wet period (May to Oct)	92	72
(b)	Dry period (Nov to Apr)	101	60
(c)	Cool period (Dec to Jan)	91	56

Average rainfall for ten years (1968 - 1977) recorded at the station is 103.41 inches, with 112.50 rainy days. The greater part falls between May and October, the heaviest months being July and August. The year 1977 receives a rainfall of 83.01 inches with 117 rainy days. The average monthly rainfall for the years is as follows:

Month	Ten years average (1968 - 1977)		1978	
	Inches	Days	Inches	Days
January	0.60	0.7	0.20	1
February	-	-	0.30	1
March	0.35	0.7	-	-
April	0.73	1.1	-	-
May	13.80	12.80	9.00	14
June	17.97	21.50	9.04	19
July	23.11	24.20	17.76	25
August	24.53	22.30	31.50	27
September	13.55	15.50	13.36	22
October	6.6	10.50	4.08	10
November	1.99	2.60	-	-
December	0.18	0.60	-	-
Total	103.41	112.50	85.24	119

STAFF

6. There are three main sections on the station viz: Farm section, Research section and Training section, employing 50 field and office staff members and 32 permanent labourers. Seasonal labourers employed during transplanting and harvesting operations ranges from 100 to 200.

	Office		Personnel
1.	Farm Manager		1
2.	Deputy Farm Managers		4
	(a) Farm section	1	
	(b) Research section	1	
	(c) Training section	1	
	(d) Admin. and Accounts	1	
3.	Assistant Farm Managers		5
	(a) Farm section	2	
	(b) Research section	1	
	(c) Training section	2	
4.	Field Inspectors		9
	(a) Farm section	3	
	(b) Research section	2	
	(c) Training section	4	
5.	Field Assistants		22
	(a) Farm section	8	
	(b) Research section	4	
	(c) Training section	10	
6.	Clerical Staff		3
7.	Tractor Drivers		3
8.	Engine Driver		1
9.	Motor-car Driver		1
10.	Carpenter		1
	Total		50

PROGRAMME FOR THE YEAR 1978 - 1979

7. The general outline of the programme for the fiscal year 1978 - 1979 is as follows:

A. Farm Section

Farm section is responsible for seed production of Improved Varieties on 245 acres during the wet season and 67 acres with pump irrigation during the dry season as double cropping.

I. Seed Production

Wet Season

	Name of Variety	Area	
(1)	Shwe-wa-htun (IR5-mutant)	40.00	acres
(2)	Shwe-ta-soke	46.00	
(3)	Po-Kaw-gyi	39.88	
(4)	Pin-to-sein	5.16	
(5)	Manawhari	30.11	
(6)	Seintalay	18.58	
(7)	IR 34	13.91	
(8)	Si-lay	34.73	
(9)	Ngwe toe	17.00	
	Total	247.37	

Dry Season

	Variety Name	Area	
(1)	Si-lay	15.50	acres
(2)	Shwe-wa-htun	15.50	
(3)	Shwe-wa-lay	28.71	
(4)	IR 29	5.00	
(5)	IR 32	1.50	
(6)	IR 34	1.50	
	Total	67.71	

(7) Other crops

Jute	15.00	acres
Pulses	10.00	
Peanut	5.00	
	30.00	

II. Works under Seed Development Project

(a) Land Development

Topographic Map had been produced and Farm layout had been surveyed.

(b) Buildings

One warehouse 40 x 80 and Grade II and Grade III housing are under Construction.

(c) Seed Production

100 acres had been planted with the recommended high yielding varieties such as Manawhari, Shwewahtun, Seintalay and IR 34.

(d) Applied Research

Applied Research work as mentioned below had been done for the year 1978 - 1979. Research Programmes would be drawn for the year 1979 - 1980 in consultation with the specialist.

B. Research Section

Research section is responsible for rice varietal improvement and research work on problems related to rice production.

I. Rice Varietal Improvement

(a) Hybridization 5 crosses

(b) Reselection of commercial varieties

Early stage

Local varieties	5	varieties
Introduced varieties	21	varieties

Advance stage

Local varieties	18 varieties
Introduced varieties	25 varieties

(c) Yield trials

(1)	Co-ordinated national rice performance test (6 maturity groups)	72 lines
(2)	International rice yeild nursery	26 lines & varieties
(3)	Preliminary test of promising lines of Hmawbi crosses	11 lines
(4)	Performance test of local commercial varieties from different regions (3 maturiety groups)	64 varieties
(5)	Performance test of the Malaysian varieties	9 varieties

II. Agronomy

(a) Fertilizer experiments

(1)	To study the fertilizer responsibeness of IR 34 using different levels of NPK fertilizers	1 Expt.
(2)	To study the fertilizer responsiveness of Manawhari (2) using different levels of NPK fertilizers	1 Expt.
(3)	To study the effect of nitrogenous fertilizers on the eating quality of glutinous rice	1 Expt.

(b) Specing experiments

(1)	Spacing vs. Fertilizer (IR 28)	1 Expt.

(c) Weed control

(1)	To evaluate the effectiveness of 5 different weedicides	1 Expt.
(2)	To find out the optimum dosage of granular weedicides Saturn 10 G.	1 Expt.

III. Plant Protection

(a) Crop pests

(1) To study the ecology of some important pests.

- Rice ear nibblings caterpillar (Mythimna separata)
- Yellow rice stemborer (Tryporyza Incertulas)
- Brown plant hopper and green leaf hopper of rice (N. Lungens and N. Virescens)
- Groundnut leaf roller (Archips Micaceava)

(2) Assessment of crop losses due to stemborer of rice. Yellow stemborer. (Tryporyza Incertulas)

(3) Spraying experiment — 1 Expt.

(4) Integrated pest control trial especially of stemborer and ear cutting caterpillar

- Combining insecticides spray with light trap

(b) Rice diseases

(1)	Bacterial leaf blight screening test	36 varieties
(2)	Bacterial leaf streak screening test	36 varieties
(3)	Helminthosporium screening test	36 varieties
(4)	International rice blast nursery	527 varieties
(5)	Survey of diseases on maize, gram, sunflower and ufra disease of rice	
(6)	Survey of disease incidence on rice seed	
(7)	Chemical control of rice blast disease and sunflower root-rot	

IV. Multiple Cropping

(a) Rice base multiple cropping pattern tirals

	1st crop:	2nd crop:
(1)	Rice	Followed by – peanut, mung bean, cow pea, gram, sunflower and maize
(2)	Jute	Rice
(3)	Sesamum	Rice

During dry season irrigation is given from the tube wells.

C. Training Section

	Training Programme	Participants
(1)	Defence services personnel 6 months training	150 each
(2)	Farmers short term one week training (4 courses)	150 each
(3)	Extensions village managers in service one month training (2 courses)	50 each
	Total	850

資料Ⅶ. ビルマ主要統計

アジア経済研究所　動向分析部
桐　生　稔　氏提供

(注) 出所はすべて" Report to the Pyithu Hluttaw by Socialist Republic of the Union of Burma on the Financial, Economic, and Social Conditions for 1978-79 ", Ministry of Planning and Finance. による。

第１表　人口の推移と年増加率

年	全人口（1,０００人）	年増加率(%)
1961	22,000	
1962	22,688	2.198
1963	23,187	2.199
1964	23,697	2.200
1965	24,218	2.199
1966	24,751	2.201
1967	25,303	2.230
1968	25,867	2.229
1969	26,444	2.231
1970	27,034	2.231
1971	27,637	2.231
1972	28,262	2.261
1973	28,886	2.208
1974	29,521	2.198
1975	30,170	2.201
1976	30,834	2.000
1977	31,512	2.200
1978	32,206	2.200

第２表　部門別就業人口（１９７７－７８）

（単位：1,０００人）

部門	公共部門	協同組合及民間	計
農業	73	8,139	8,212
漁業・畜産	8	159	167
林業	73	79	152
鉱業	65	2	67
製造業	160	769	929
電力	15	–	15
建設	124	60	184
運輸・通信	104	316	420
社会・サービス	174	72	246
行政	459	24	483
商業	45	1,161	1,206
非分類労働	–	559	559
合計	1,300	11,340	12,640

第３表　国内生産額の推移（１９６９～７０年度価格換算）

項目	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78（暫定）
	（単位：１０万チャット）														
1. 生産財（生産者価格）計	92,516	101,492	97,545	94,022	104,771	107,138	110,092	114,233	114,649	106,646	109,095	110,408	117,565	123,920	134,095
農業	29,299	31,478	92,271	26,650	31,072	31,891	32,763	34,756	35,447	32,909	36,188	35,649	37,288	38,974	40,915
漁業・畜産	7,487	7,492	6,640	8,276	8,930	8,742	9,459	10,316	10,558	9,200	10,300	10,212	10,708	11,083	11,671
林業	3,595	3,764	3,969	3,933	4,039	4,010	3,985	4,266	4,237	4,127	3,630	4,237	4,053	4,264	4,872
鉱業	1,716	2,055	1,648	1,787	1,801	2,025	2,923	1,127	2,353	2,456	2,101	2,115	2,146	2,471	3,130
製造業	44,870	51,036	48,958	46,307	51,586	52,535	54,085	55,172	54,575	50,261	49,674	50,845	55,835	59,040	64,470
電力	627	414	756	768	816	873	938	1,020	1,006	1,113	1,156	1,146	1,261	1,391	1,554
建設	4,922	5,053	6,303	6,371	6,527	7,112	6,939	6,576	6,473	6,580	6,046	6,204	6,274	6,697	7,483
2. サービス計	28,207	30,514	31,185	30,389	31,134	32,360	34,195	35,292	37,765	40,177	40,062	42,671	43,670	46,703	50,292
運輸	8,726	9,067	9,356	9,374	8,994	9,431	9,732	10,163	10,612	10,433	9,947	10,276	10,457	10,388	11,117
通信	328	354	323	304	405	371	393	439	459	419	452	080	470	558	507
金融	1,466	1,624	1,402	1,342	1,611	1,490	1,292	1,476	1,826	2,366	2,295	2,651	2,150	3,255	3,074
社会・行政	10,959	12,245	12,545	11,687	12,275	3,105	14,146	14,398	15,849	17,470	17,649	19,291	20,452	22,129	24,955
その他サービス	6,728	7,224	7,559	7,682	7,849	17,963	8,632	8,816	9,018	9,489	9,719	9,373	10,141	10,373	10,639
3 商業	26,312	29,683	26,308	25,138	28,594	28,755	3,067	30,301	31,704	32,152	32,474	33,262	34,940	36,638	38,620
1 国内総生産計（1+2+3）	147,035	161,689	155,038	149,619	164,499	168,303	174,354	179,826	184,118	178,975	181,631	186,841	196,175	207,261	223,007
5 国内産業間使用	64,320	70,626	67,888	66,069	72,500	73,275	74,597	75,945	77,711	73,598	73,514	75,723	80,558	84,817	92,671
6. 国内純生産（４－５）	82,715	91,063	87,150	83,550	91,999	95,028	99,797	103,081	106,407	105,377	108,117	111,118	115,617	122,444	130,336
7 輸入（ＣＩＦ）	12,065	14,214	8,477	7,888	6,904	7,834	8,968	7,899	7,574	4,942	3,307	4,574	4,543	4,427	8,650
8. 輸出（ＦＯＢ）	10,865	9,959	8,441	5,703	4,196	4,850	5,354	6,499	6,810	5,575	4,999	5,113	4,478	4,908	6,092
9 純国民生産計（6+7−8）	83,915	95,318	87,186	85,735	94,707	98,012	103,371	105,231	107,171	104,744	106,425	110,579	115,682	121,963	132,894
国内消費計	74,838	79,691	84,700	77,622	80,713	85,679	90,259	93,081	94,939	95,479	96,338	99,520	104,113	109,900	116,620
国内投資計	8,738	8,548	9,124	9,845	10,149	10,984	11,531	10,192	10,914	8,947	7,731	7,810	8,065	9,553	15,325
ストック・チェンジ	+339	+7,079	+6,638	+1,732	+3,845	+1,349	+1,581	2,008	1,318	+318	+2,356	+3,249	+3,504	2,510	+949
	（単位　１０万チャット）														
1人当り国内総生産	620	668	626	591	636	636	645	651	651	620	615	619	636	658	692
1人当り国内純生産	349	376	352	330	356	359	369	376	377	365	366	368	375	389	405
1人当り国民所得	354	394	352	339	366	371	334	381	379	363	361	367	375	387	413
1人当り国民消費	316	329	342	307	312	324	43	337	336	331	326	330	338	349	362
1人当り国民投資	37	35	37	39	39	42	43	37	39	31	21	26	26	30	48
就業者1人当り生産					1,559	1,569	1,604	1,643	1,643	1,568	1,561	1,590	1,618	1,674	1,764
就業者1人当り純生産					872	886	918	951	949	923	929	946	945	989	1,031

第４表　国内純生産の推移と部門別構成（１９６９－７０年度価格換算）

（単位　１０万チャット）

部門	1969-70		1970-71		1971-72		1972-73		1973-74		1974-75		1975-76		1976-77		1977-78（暫定）	
	額	%	額	%	額	%	額	%	額	%	額	%	額	%	額	%	額	%
1. 生産部門計	51,617	51.7	55,088	53.0	55,635	52.3	52,512	49.6	55,119	51.0	55,267	49.7	58,210	50.1	61,943	50.5	66,361	50.9
農業	27,127	27.2	28,962	27.9	29,536	27.8	27,654	26.1	30,288	28.0	29,628	26.6	31,219	26.9	33,064	27.0	34,928	26.9
漁業・畜産	7,359	7.4	8,042	7.7	8,235	7.7	7,148	6.7	8,028	7.4	7,940	7.1	8,339	7.2	8,624	6.9	9,087	6.9
林業	2,576	2.6	2,842	2.7	2,765	2.6	2,720	2.6	2,360	2.2	2,743	2.5	2,627	2.2	2,783	2.3	3,182	2.4
鉱業	1,108	1.1	1,488	1.4	1,372	1.3	1,388	1.3	1,200	1.1	1,209	1.1	1,221	1.1	1,386	1.0	1,788	1.4
製造業	10,714	10.7	11,069	10.7	11,074	10.4	10,811	10.2	10,541	9.8	10,941	9.8	11,892	10.2	12,838	10.4	13,817	10.6
電力	610	0.6	669	0.6	651	0.6	719	0.8	887	0.8	861	0.8	921	0.8	1,074	0.8	1,166	0.9
建設	2,122	2.1	2,034	2.0	2,002	1.9	2,079	1.9	1,875	1.7	1,945	1.8	1,991	1.7	2,174	1.7	2,393	1.8
2. サービス部門計	22,749	23.0	23,404	22.5	24,775	23.3	27,091	25.5	26,369	24.4	28,166	25.4	29,158	25.1	30,458	24.8	32,480	24.9
運輸	5,854	5.9	5,855	5.6	6,085	5.7	5,873	5.5	5,546	5.1	5,728	5.2	5,866	5.0	5,876	4.8	6,330	4.8
通信	334	0.3	380	0.4	398	0.4	352	0.3	383	0.4	406	0.4	400	0.4	475	0.4	433	0.3
金融	1,121	1.1	1,293	1.2	1,686	1.6	2,044	1.9	1,843	1.7	2,160	1.9	1,454	1.3	2,141	1.7	2,093	1.6
社会・行政	8,153	8.2	8,379	8.1	9,034	8.5	10,874	10.3	10,379	9.6	11,455	10.3	12,848	11.0	13,184	10.7	14,614	11.3
その他サービス	7,485	7.5	7,497	7.2	7,572	7.1	7,948	7.5	8,218	7.6	8,417	7.6	8,590	7.4	8,782	7.2	9,010	6.9
3. 商業	25,193	25.3	25,389	24.5	25,997	24.4	26,948	24.9	26,629	24.6	27,685	24.9	28,830	24.8	30,043	24.7	31,495	24.2
純生産計	99,757	100.0	103,881	100.0	106,407	100.0	105,975	100.0	108,117	100.0	111,118	100.0	116,198	100.0	122,444	100.0	130,336	100 0

第５表　所有型態別部門別生産額（１９６９－７０年度価格）

（単位　１０万チャット）

部門	1974-75			1975-76			1976-77			1977-78（暫定）		
	国営	協同組合	民間	国営	協同組合	民間	国営	協同組合	民間	国営	協同組合	民間
1. 生産部門計	9,334	314	45,596	10,223	549	47,586	11,859	658	49,426	13,475	836	52,050
農業	46	–	29,582	49	–	31,170	57	25	32,982	93	142	34,693
漁業・畜産	51	55	7,834	128	86	8,125	88	79	8,457	118	85	8,884
林業	904	36	1,780	773	92	1,764	849	102	1,832	1,029	111	2,042
鉱業	983	18	173	1,001	11	190	1,161	45	180	1,530	48	210
製造業	5,408	205	5,370	6,196	360	5,446	7,350	407	5,081	8,028	450	5,339
電力	886	–	–	971	–	–	1,074	–	–	1,166	–	–
建設	1,056	–	857	1,105	–	891	1,280	–	894	1,511	–	882
2 サービス部門	16,930	252	10,983	17,080	330	11,218	18,627	508	11,323	20,396	534	11,550
運輸	2,153	79	3,502	2,155	126	3,570	2,053	264	3,559	2,436	260	3,631
通信	396	–	–	400	–	–	475	–	–	433	–	–
金融	2,147	18	–	1,429	32	–	2,099	42	–	2,044	49	–
社会・行政	11,470	–	–	12,331		–	13,184	–	–	14,614	–	–
その他サービス	764	155	7,481	765	172	7,648	816	202	7,764	866	225	7,919
3 商業	10,703	1,177	15,722	11,352	1,755	15,524	11,874	2,523	15,646	12,891	2,928	15,676
計（1+3+4）	36,967	1,743	72,301	38,655	2,634	74,328	42,360	3,689	76,395	46,762	4,298	79,276
全体の構成比(%)	33.3	1.6	65.1	33.4	2.3	64.3	34.6	3.0	62 4	35.9	3.3	60.8

第6表　経営規模別農家戸数と面積

経営規模	1974-75				1975-76				1976-77			
	数		%		数		%		数		%	
	農家数	面積（エーカー）	農家数	面積	農家数	面積（エーカー）	農家数	面積	農家数	面積（エーカー）	農家数	面積
5エーカー以下	2,708,407	6,073,798	62.55	25.86	2,729,265	6,145,641	62.70	26.10	2,738,686	6,170,594	62.65	26.16
5～10エーカー	1,041,202	7,496,579	24.05	31.91	1,045,915	7,532,337	24.03	31.99	1,053,516	7,571,345	24.10	32.09
10～20エーカー	467,071	6,564,665	10.79	27.95	466,058	6,541,827	10.71	27.79	469,755	6,593,773	10.75	27.95
20～50エーカー	111,099	3,067,091	2.56	13.06	109,514	3,034,718	2.51	12.89	107,101	2,973,450	2.45	12.60
50～100エーカー	1,847	118,502	0.04	0.50	1,822	116,981	0.04	0.50	1,756	110,757	0.04	0.47
100エーカー以上	290	169,146	0.01	0.72	292	170,866	0.01	0.73	305	173,036	0.01	0.73
計	3,429,906	23,489,781	100.00	100.00	4,352,866	23,542,370	100.00	100.00	4,371,119	23,592,955	100.00	100.00

第7表　土地利用　（単位 1,000エーカー）

利用形態	1973-74	1974-75	1975-76	1976-77	1977-78（暫定）
純耕作地	19,690	19,758	19,819	19,544	19,714
休閑農地	4,947	4,914	4,881	5,141	4,977
耕作可能荒地	21,206	21,169	21,119	21,143	21,165
管理森林	23,476	23,477	23,477	23,477	23,477
その他の森林	56,335	55,995	55,987	55,990	55,986
その他	41,532	41,873	41,903	41,891	41,867
計	167,186	167,186	167,186	167,186	167,186

第8表　主要農産物生産量　（単位 1,000トン）

農産物	1972-73	1973-74	1974-75	1975-76	1975-77	1977-78（暫定）
糊	7,241	8,466	8,448	9,062	9,172	9,499
小麦	26	24	63	56	75	92
メイズ	55	60	64	60	57	74
マッペ	32	24	23	15	12	34
バターピーン	36	41	36	34	32	36
Sultapya	22	13	16	17	26	30
Peboke	13	12	13	12	16	16
Pulses	162	174	193	178	135	131
落花生（カラつき）	377	405	459	404	416	457
胡麻	69	52	94	232	91	109
綿花	43	37	42	37	31	41
ジュート	88	78	39	37	27	55
ゴム	15	15	15	14	15	15
砂糖キビ	2,000	1,661	1,185	1,605	1,600	1,786
ビルマ葉タバコ	50	32	35	44	58	58
ヴァージニアタバコ	16	10	19	12	21	24

（注）農業年度は7月～6月。

第９表　主要鉱産物生産量

品目	単位	1970-71	1971-72	1972-73	1974-74	1974-75	1975-76	1976-77	1977-78 (暫定)
原油	Thausand U.S. Bls	6,230	7,238	7,468	7,027	6,773	7,094	8,584	10,950
天然ガス	Mill. Cu. ft.	2,333	3,610	3,987	4,575	5,566	7,656	8,481	10,200
錫鉱	Ton	475	550	370	450	447	598	360	866
タングステン	Ton	318	683	580	566	575	505	332	568
錫・タングステン混成鉱	Ton	320	226	381	86	110	–	–	–
錫・タングステン，灰重石混成鉱	Ton	574	652	635	373	387	402	376	500
銀	Thausand Ozs.	786	689	711	303	413	173	187	410
鉛	Ton	8,713	7,520	9,625	4,529	4,921	2,444	2,721	5,198
亜鉛	Ton	7,030	7,491	7,000	6,155	5,665	4,425	3,860	6,000
銅	Ton	235	203	207	127	78	40	86	90
ニッケル	Ton	169	163	133	64	77	30	58	75
アンチモニアル鉛	Ton	288	191	300	174	173	102	116	125
ヒスイ	Viss	2,266	4,225	9,967	3,917	4,410	2,418	19,221	4,000
石灰	Ton	561,000	586,000	500,000	428,000	475,000	585,302	635,000	1,141,000
石灰	Ton	14,150	17,234	10,648	12,983	12,947	15,308	18,398	27,000
アンチモニー	Ton	637	600	496	486	581	794	510	1,455
石材	Sud	532,000	496,000	500,000	473,253	483,619	483,179	442,000	470,000
硫化鉛	Ton	768	1,376	1,900	1,700	1,887	–	–	–
河砂利	Sud	144,000	145,000	146,000	135,922	125,842	115,499	125,000	124,000
Tarazo Stone	Thausand Ton	198	211	76	88	57	43	28	200

第１０表　政府直営工場数（１９７７−７８年度）

業種	操業中	建設中	計	民間及協同組合
食品・飲料	169	26	195	9,244
衣料・繊維	61	2	63	16,518
建設・資材	113		113	954
日用品加工	14	3	17	1,836
家庭用品製造	10	2	12	1,711
印刷・出版	28	4	28	158
工業用原料	454	1	458	346
鉱物加工	19		20	4,017
農業資材	4		4	24
工業機械	7		7	2
車輛	4		4	28
その他産業資材	6		6	732
発電所	314	1	315	–
修理・造船	303	4	307	–
計	1,506	43	1,549	35,588

第１１表　従業員数別工場数（１９７７−７８年度）

労働者数	国営	政府管理	協同組合	民間	計
10人以下	694	0	141	33,739	34,574
10〜50人	241	8	677	846	1,772
51〜100人	146	4	73	35	258
100人以上	425	2	46	17	490
計	1,506	14	937	34,637	37,094

第12表　主要工業製品生産量

商品	単位	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78（暫定）
砂糖	(000) ton	69	34	21	29	29	36
塩	(000) ton	171	185	110	127	196	198
紙巻タバコ	No. (million)	1,442	1,942	1,411	1,909	2,458	2,440
綿糸	(000) ton	9.8	6.1	6.7	12.2	13.2	13.5
綿布	yds (lakh)	45	53	55	83.5	136.3	112
ポプリン	yds (lakh)	55	10	46	44.6	51.1	50
蚊張	yds (lakh)	15	2	20	21.5	35.4	68.4
毛布	No. (lakh)	13	9	7	14.5	14.7	14.8
タオル	No. (lakh)	14	12	10	16.2	18.9	15.5
綿肌着	No. (million)	2.1	2.7	3.5	6.2	4.9	2.3
男用ロンジー	No. (lakh)	96	98	73	73.5	56.7	113.8
女用ロンジー	No. (lakh)	12	7	12	4.0	10.3	16.5
小児用ロンジー	No. (lakh)	21	9	9	12.3	3.9	19.0
麻袋	No. (lakh)	202	128	106	182.7	176.5	178.7
洋傘	(000) dozen	44	26	49	51.0	79.9	100.0
万年筆	(000) No.	215	165	437	526.8	552.2	600.0
石けん	(000) ton	38.6	26.1	39.4	44.9	50.0	47.2
マッチ	(000) case	190	210	217	133.1	124.2	180.3
ローソク	(000) ton	4.75	4.8	3.9	3.1	3.3	7.9
レンガ・タイル	No. (lakh)	905	866	601	908	1,398	1,539
セメント	(000) ton	220	150	202	207	255	365
ワイヤー・クギ	(000) ton	4.1	2.8	2.3	3.0	4.9	6.0
石油	gallon (lakh)	510	611	636	520	610	612
灯油	gallon (lakh)	569	632	687	474	357	517
アルミポット・鍋	lbs (lakh)	15	12.8	11.4	17.3	21.6	26.8
石油コンロ	(000) Nos.	3.7	–	–	–	–	–
螢光灯	(000) Nos.	3,992.8	2,082	1,252	1,043	1,247	600
バッテリー	(000) Nos.	16,541.9	17,705	15,831	14,668	16,059	20,700
ラジオ	(000) Nos.	18.8	33	30	30.2	24	22
自動車	No.	1,887	948	1,078	817	1,044	1,884
自転車	No.	7,400	9,635	9,760	9,580	12,916	19,000
揚水ポンプ	Pairs	3,051	5,369	3,968	4,217	5,778	8,612
トラクター	No.	1,009	1,012	305	755	854	1,300
化学肥料	(000) ton	77.0	107.0	117.0	118.8	130.6	131.8
ディゼル・オイル	gallon (lakh)	581	577	742	755	745	757
鉱炉用油	gallon (lakh)	366	289	331	–		

第１３表　商品別輸入高　　（単位　１０万チャット）

商品	1970-71	1971-72	1972-73	973-74	1974-75	1975-76	1976-77（暫定）
資本財計	3,548	4,584	2,788	2,172	2,963	5,051	6,638
建設資材	993	957	678	306	911	1,637	1,397
機械	1,889	2,788	1,747	1,521	1,424	2,704	3,476
輸送機器	548	670	197	242	411	491	1,514
その他資本材	118	151	166	103	217	219	251
工業用原材料計	3,717	3,620	3,389	2,741	5,703	7,446	6,995
原料	2,829	2,894	2,429	2,156	4,086	4,929	5,440
燃料	181	138	258	24	536	709	202
機具・部品	707	588	702	561	1,081	1,808	1,353
消費財計	1,247	998	808	813	1,456	1,869	1,445
耐久消費財	160	156	185	142	171	310	315
食料	252	263	234	250	283	422	470
繊維	508	417	179	242	128	735	213
医薬品	158	116	173	136	315	308	352
その他消費財	169	46	37	42	59	94	95
その他	9	57	57	23	36	67	133
合計	8,521	9,214	7,142	5,749	10,158	14,433	15,211

第１４　商品別輸出高　　（単位　１０万チャット）

商品	1972-73	1973-74	1974-75	1975-76	1976-77（暫定）
農産物	3,326	5,618	5,245	7,839	8,858
畜産・水産品	44	38	30	43	184
林産品	2,091	2,648	2,318	2,870	3,839
鉱産品・宝石	1,233	901	1,162	1,003	1,065
その他	104	322	361	161	198
計	6,798	9,527	9,116	11,916	14,144
再輸出	104	143	142	1,310	3,013
合計	6,902	9,670	9,258	13,226	17,157

第１５表　貿易収支の推移

（単位　10万チャット）

年	輸出	輸入	収支
1940-41	5,553	3,082	(+) 2,470
1947-48	7,573	5,958	(+) 1,615
1960-61	10,151	10,805	(-) 654
1961-62	12,718	10,439	(+) 2,282
1962-63	12,706	10,962	(+) 1,744
1963-64	11,417	10,860	(+) 557
1964-65	10,891	14,129	(-) 3,238
1965-66	9,289	8,035	(+) 1,254
1966-67	6,722	8,166	(-) 1,444
1967-68	5,209	7,570	(-) 2,661
1968-69	5,572	7,533	(-) 1,961
1969-70	5,385	8,968	(-) 3,583
1970-71	5,911	8,521	(-) 2,610
1971-72	6,860	9,214	(-) 2,354
1972-73	6,902	7,042	(-) 140
1973-74	9,670	5,749	(+) 3,921
1974-75	9,258	10,158	(-) 900
1975-76	13,226	14,433	(-) 1,207
1976-77	17,157	15,211	(+) 1,946
1977-78（暫定）	18,106	30,530	(-) 12,424

第16表　国際収支

（1977～78年度暫定）（単位 10万チャット）

項目	収入	支出
1 経常勘定		
貿易	18,106	30,530
運賃保険	400	1,450
観光	250	160
大使館・国際機関	120	400
政府移転	–	250
民間移転	150	10
利子	400	1,378
その他	700	250
計	20,126	34,428
2 贈与	1,551	66
3 借款及び利子		
借款	12,149	–
元本支払	–	1,837
計	12,149	1,837
4 投資勘定		
アジア開銀	–	55
計	–	55
5 合計（1+2+3+4）	33,826	36,386
6. 資本勘定		
短期借款	1,700	3,000
I. B. F. C	583	583
I. M F		
引出し	2,979	–
SDR引出し	531	–
返済	–	876
計	5,793	4,459
7 その他	–	–
8 合計（5+6+7）	39,619	40,845
9 収支	–	(-) 1,226
10. 外貨準備高	–	6,364

第17表　外貨準備高

（単位 10万チャット）

年（月）	金	外貨	計
1962（9月末）	800	7,410	8,210
1965（〃）	3,985	4,205	8,190
1969（〃）	3,985	3,284	7,269
1970（〃）	2,988	1,074	4,692
1971（〃）	1,026	2,016	3,042
1972（〃）	835	2,626	3,461
1973（〃）	487	4,083	4,525
1974（3月末）	405	5,612	6,017
1975（〃）	541	10,241	10,782
1976（〃）	541	8,392	8,933
1977（〃）	576	7,014	7,590
1978（9月末）	633	6,674	7,307

（注）IFSによれば，78年9月末までの外貨準備高は1億3110万ドルである。

第18表　ラングーンの主要商品別小売価格

（単位 チャット）

商品	単位	1974年11月		1975年11月		1976年11月		1977年11月	
		協同組合販売価格	自由市場	協同組合販売価格	自由市場	協同組合販売価格	自由市場	協同組合販売価格	自由市場
米（Ngasein種）	Pyi	1.58	2.67	1.75	2.50	1.90	2.49	1.90	2.80
食用油	Viss	14.67	18.00	19.50	36.58	21.00	74.71	30.00	40.47
塩	Viss	0.58	2.00	0.70	4.00	1.85	4.31	1.85	3.25
コンデンスミルク（14オンス）	Tin	2.35	7.00	4.05	12.00	5.25	14.38	4.60	10.67
砂糖	Viss	2.65	15.00	4.25	49.00	6.55	22.00	6.55	28.93
Ngapi	Viss	3.47	7.92	3.78	10.33	3.78	14.85	6.30	13.98
Nganpyaye	Viss	3.33	6.83	3.52	7.88	3.52	12.40	5.60	10.30
男用ロンジー（2/64×2/64）	Piece	11.30	26.65	11.30	26.00	26.00	46.09	29.00	43.25
女用ロンジー布	Piece	9.80	21.50	11.50	25.00	14.80	27.50	14.80	28.30
肌着（1×40）	Piece	3.95	10.57	6.70	13.40	7.70	16.75	7.70	12.00
乾電池	No.	1.30	2.55	1.60	2.88	2.15	5.25	2.15	4.18
マッチ	Box	0.12	0.25	0.12	0.20	0.12	0.30	0.15	0.34
消毒用石けん	Cake	1.00	2.10	1.45	2.50	1.40	2.60	1.60	2.23
洗濯石けん	Bar	2.35	6.85	3.30	10.00	3.30	4.45	3.10	4.30

資料　Ⅷ．ビルマ国および対象地域土壌図

1　ビルマ国土壌図

ビルマ国の土壌に関しては，政府機関による正式の印刷物はまだ見当らないようである。資料として入手したビルマ全国の土壌図（８０×４０cm）は農林省のSurvey Departmentの手になるもので，これを若干縮小し，上～中ビルマと下ビルマに分けて，ほぼ全国をカバーするようにして掲げた。色彩を使えないので土壌名に番号をつけLegend として添えてある。かなり旧式の名称になっているが，これは戦後ノ連の協力で土壌調査が行なわれたと聞いているので，その方式に準じたものであろう。

2　ＦＡＯ世界土壌図におけるビルマ地域

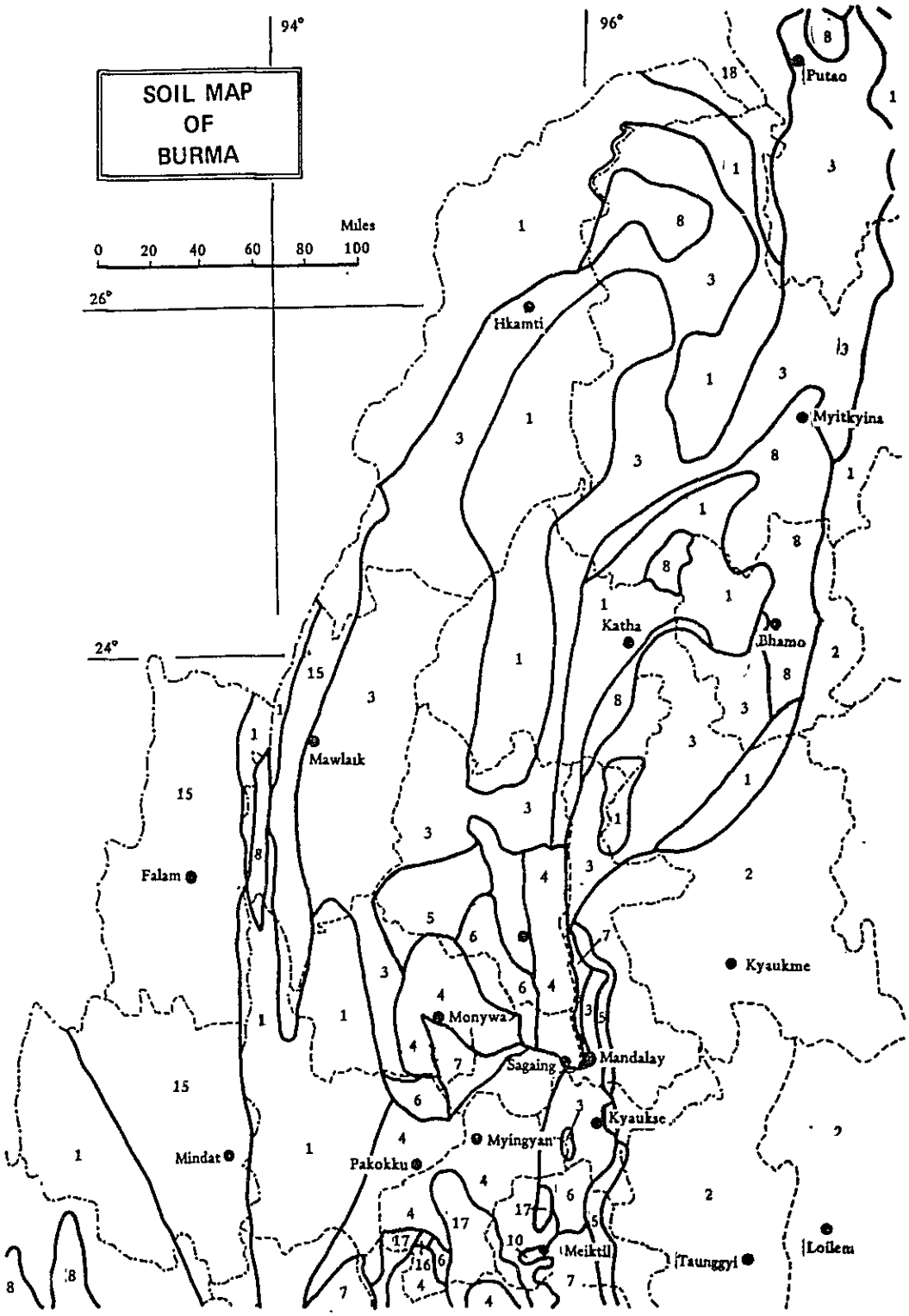
FAO－UNESCO が１９７７年にほぼ完成した世界土壌図から，ビルマ地域を抽出したのが次の土壌図である。土壌区分では前者を多少統合してあり，名称は新しく打出されたＦＡＯの分類によるもので，全く違っている。しかし各土壌の境は補足調査によりやゝ変ってはいる程度で，大筋としては大差がないとみてよい。この図に付した土壌番号は次の対比表の通りである。いずれも，この程度の大縮尺になると土壌の共存（ association ）と随伴（ inclusion）があって，単一土壌のみの図示は難しい。

対比は図面上における土壌区分の重なりをみて機械的に示したものである。ビルマ国発行のものには説明書がないので，詳しくは今後の調査にまつほかはない。

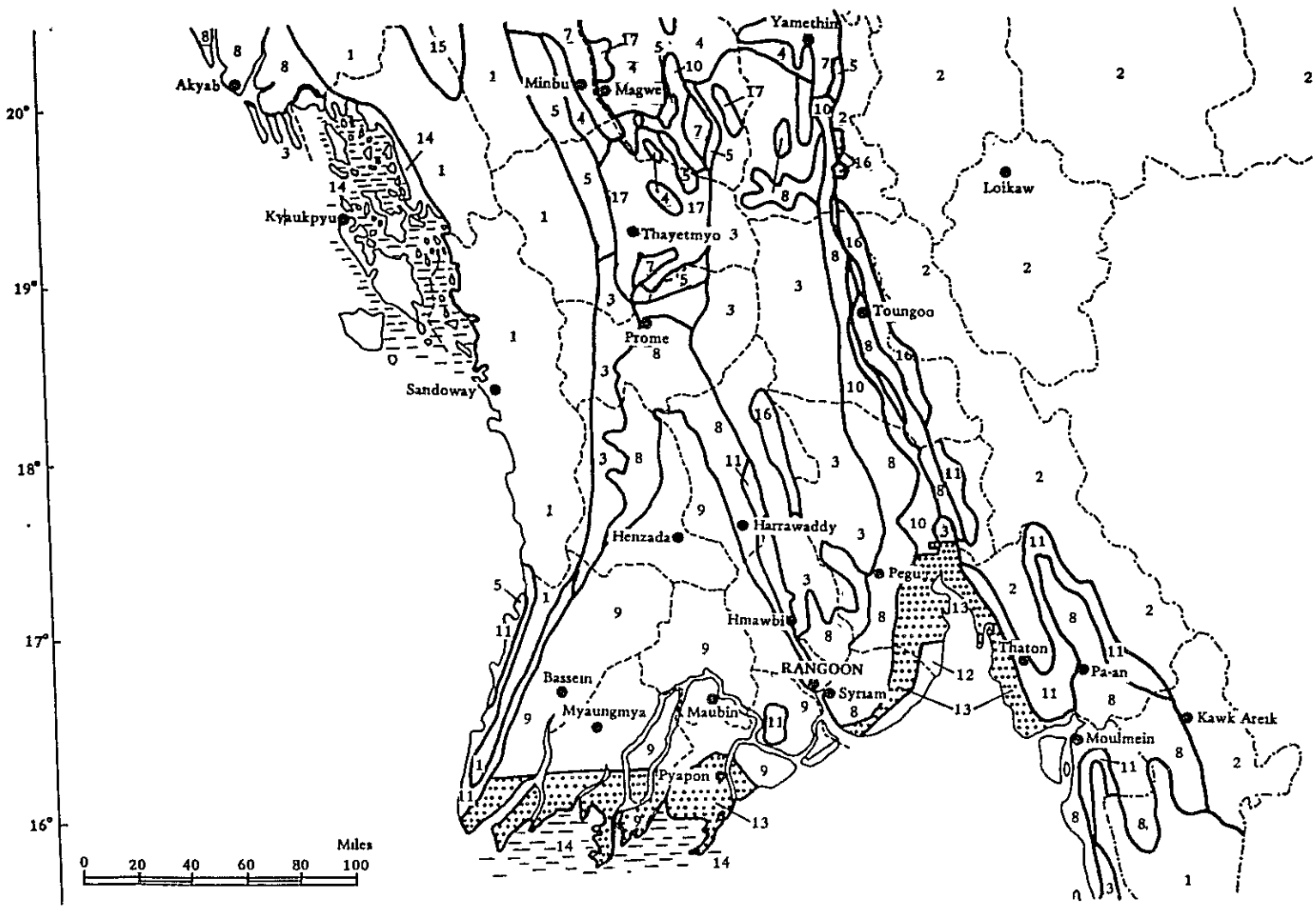
3　Prome 地域の土壌図

これはＡＣとの会談において，先方が見せてくれた手書きの土壌図を写真に撮ったものから作成したものである。この種の土壌図は開発計画地域については大体用意されているらしい。Legend の土壌名も先の政府発行の図とほとんど同じものが使用されている。

本図から分るように，North Nawin かんがい地区の土壌は大半がMeadow Soil(2)で，農業試験場の建設予定地はIrrawaddy川の氾らんによってできた，土性の粗い沖積土壌(4)に属していることである。



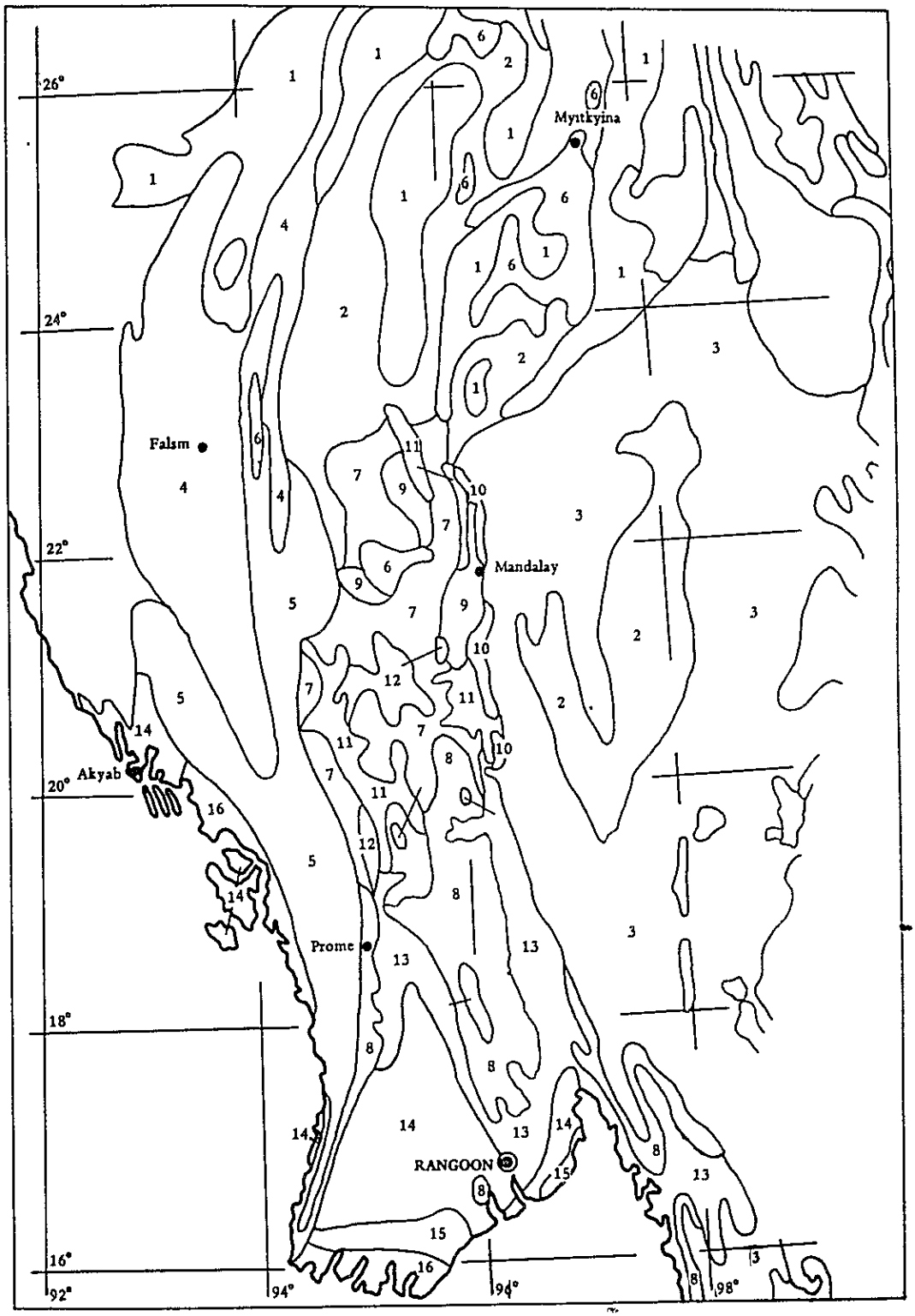
SOIL MAP OF UPPER AND MIDDLE BURMA AREAS
(BURMA SURVEY DEPT.)



SOIL MAP OF LOWER BURMA AREA
(BURMA SURVEY DEPT.)

Legend for Soil Map of Burma

1. Red Brown Forest Mountainous Red Brown Forest and Turfy Primitive Soil
2. Red Earth and Mountainous Red Earth
3. Yellow Brown Forest Mountainous Yellow Brown Forest and Turfy Primitive Soil
4. Red Brown Savanna Soil
5. Cinnamon Soil of Dry Forest and Bushes
6. Dark Compact Soil of Savanna
7. Dark Meadow Soil (Meadow Soil of Upper Burma)
8. Light Coloured Meadow Soil (Meadow Soil of Lower Burma and Similar Soil)
9. Complex of Light Coloured Meadow Meadow Swampy Meadow Alluvial and Swampy Soil
10. Meadow Alluvial Soil
11. Lateritic Soil and Laterites
12. Salty Mud
13. Saliny Soil
14. Soils of Mangrove Forest
15. Turfy Primitive and Mountainous Red Brown Forest Soil
16. Turfy Primitive Soil
17. Primitive Crushed Stone and Red Brown Primitive Eroded Soils of Savanna
18. Mountainous Meadow Alpic Mountainous Brown Forest and Turfy Primitive Soil



SOIL MAP OF BURMA AREA
(FAO Soil Map of the World, 1:500,000)

ＦＡＯ世界土壌図によるビルマ地域土壌とビルマ国土壌図との対比

Ⅰ　北部地域および山岳地域

土壌記号	主要土壌	共存土壌	随伴土壌	ビルマ国土壌名
1. Ao 76 - 2/3c	Orthic Acrisols 低塩基状態で移動集積の粘土をもつ酸性土壌 中ー細粒質, 傾斜ー山地状	I: Lithosols Nd: Dystric Nitosols	Ah. Humic Acrisols	Red Brown Forest Soil Mountainous Forest Soil Turfy Primitive Soil (Red-Yellow Podzolic Soil)
2. Ao 89 - 2/3b	同　上 波状ー丘陵性	Af: Ferric Acrisols Lf: Ferric Luvisols	Fp: Plinthic Ferralsols Gp: Plinthic Gleysols	Yellow Brown Forest Soil Mountainous Forest Soil Turfy Primitive Soil
3. Ao 90 - 2/3c	同　上	同　上	同　上	Red Earth Mountainous Red Earth
4. Bh 16 - 2/3c	Humic Cambisols 岩石の弱い風化でできた有機質の残積土壌 中ー細粒質, 傾斜ー山地状	Ah: Humic Acrisols I: Lithosols	U: Rankers	Turfy Primitive Soil M. Red Brown Forest Soil
5. Bf 17-2C	Ferralic Cambisols Fe,Al酸化物に富む，弱風化の残積土壌 中粒質，傾斜ー山地状	Ao: Orthic Acrisols Fr: Rhodic Ferralsols	I: Lithosols Je: Eutric Fluvisols	Red Brown Forest Soil Mountainous Red Brown Forest Soil Turfy Primitive Soil
6. Gh 16 - 2/3a	Humic Gleysols グライ層をもつ有機質土壌 中粒ー細粒質, 平坦ー緩起伏	Ge: Eutric Gleysols We: Eutric Planosols	Je: Eutric Fluvisols	Light Coloured Meadow Soil (Meadow Soil)

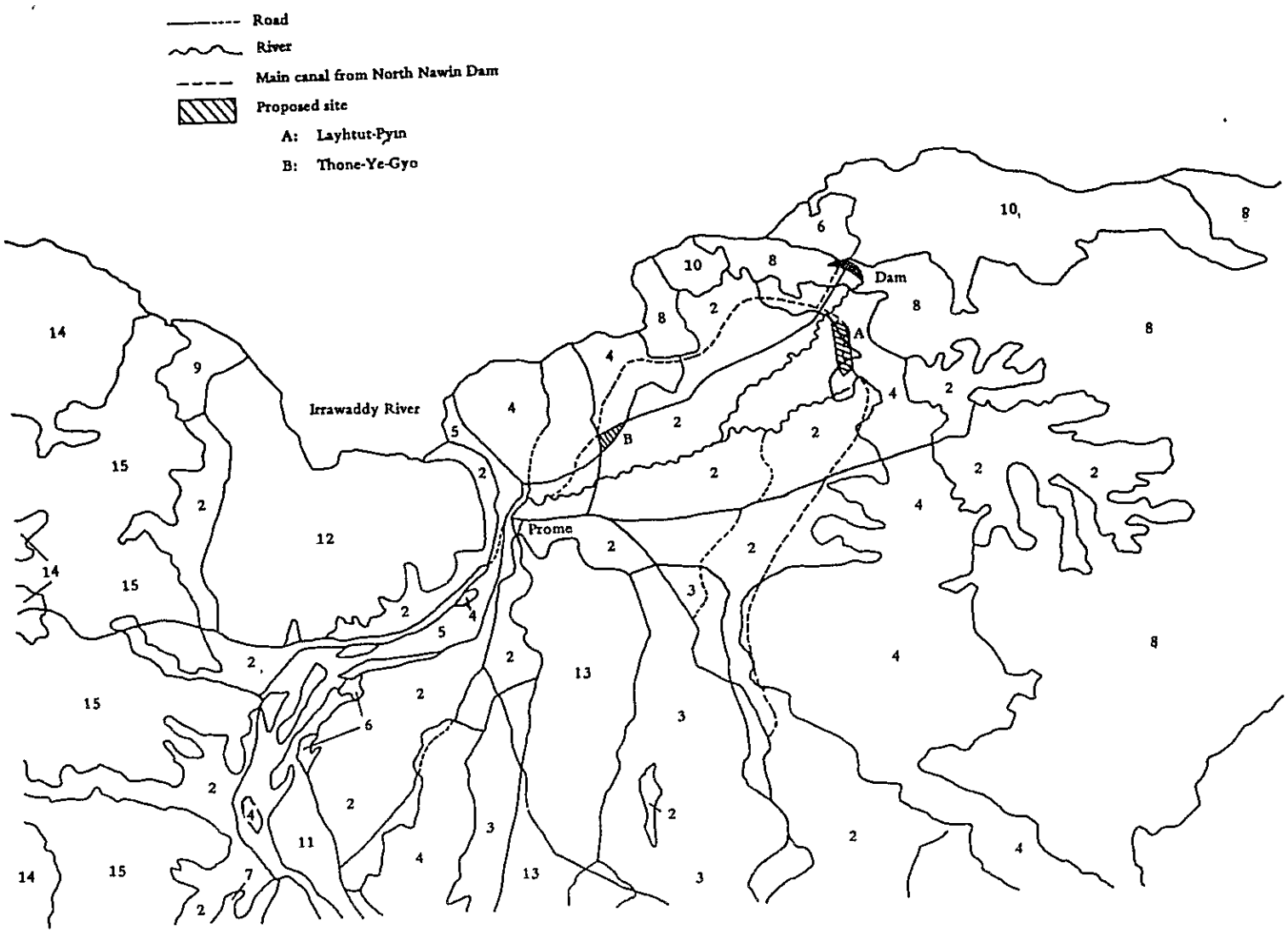
II 中 部 地 域

土 壌 記 号	主 要 土 壌	共 存 土 壌	随 伴 土 壌	ビルマ国土壌名
7. Lc 12 - 2/3ab	Chromic Luvisols 彩度高く，粘度移積層を含む比較的塩基の多い土壌 中ー細粒質， 平担ー傾斜地	Lk. Calcic Luvisols Vp: Pellic Vertisols	We: Eutric Planosols Z: Solonchaks	Red Brown Savanna Soil Cinnamon Soil (Terra Rossa, Red Brown Earth)
8. Nd 55 - 2/3b	Dystric Nitosols 光沢をもち粘土移動，塩基飽和の低い，塩基性岩に由来した土壌 中ー細粒質， 波状ー丘陵性	Af: Ferric Acrisols	Ap: Plinthic Acrisols I: Lithosols	Yellow Brown Forest Soil Mountainous Yellow Brown Forest Soil Turfy Primitive Soil (Terra Roxa, Low base status) Lateritic Soil and Laterites
9. Vp 40 - 3a	Pellic Vertisols 粘土に富み深い亀裂を示し，構造発達した彩度の低い黒色土壌 細粒質，平担ー緩起伏	Je: Eutric Fluvisols Ve: Chromic Vertisols	Zg. Gleyic Solonchaks	Dark Compact Soil of Savanna (Black Earth)
10. Bc 11 - 2a	Chromic Cambisols 彩度高く塩基に富む残積性土壌 中粒質，波状ー丘陵性	Je: Eutric Fluvisols Re: Eutric Regosols	Jc: Calcaric Fluvisols Rc: Calcaric Regosols	Cinnamon Soil
11. Gh 15 - 2/3a	Humic Gleysols （上出）	Vp: Pellic Vertisols We: Eutric Planosols	Ge: Eutric Gleysols Je: Eutric Fluvisols Z: Solonchaks	Dark Meadow Soil

土 壌 記 号	主 要 土 壌	共 存 土 壌	随 伴 土 壌	ビルマ国土壌名
12. Lf 59 - 2/3b	Ferric Luvisols Fe 酸化物に富み粘土移積層を含む塩基の多い土壌 中ー細粒質，波状ー丘陵性	Bf: Ferralic Cambisols	l: Lithosols Je: Eutric Fluvisols	Primitive Crushed Stone Soil Red Brown Pr. Eroded Soil (Red Yellow Podzolic Soil)
Gh 16 - 2/3a	Humic Gleysols （上出）			Dark Meadow Soil

III 南 部 地 域

Na 55 - 2/3b	Dystic Nitosols （上出）			
13. Ge 37 - 2/3a	Eutric Gleysols グライ層をもつ肥沃な沖積土壌 中ー細粒質，平担ー緩起伏	Gm: Mollic Gleysols We: Eutric Planosols	Je: Eutric Fluvisols Vp: Pellic Vertisols	Meadow Alluvial Soil Light Coloured Meadow Soil
14. Ge 50 - 2/3a	Eutric Gleysols 同 上	Je: Eutric Fluvisols	Jt: Thionic Fluvisols Oe: We: Eutric Planosols	Light Coloured Meadow Soil Meadow Swampy Soil Alluvial and Swampy Soil
15. Zg 4 - 3a	Gleyic Solonchaks 濃い塩類層をもち年間湛水の沖積土壌 細粒質，平担ー緩起伏		Je: Eutric Fluvisols Jt: Thionic Fluvisols	Saliny Soil
16. Jt 11 - 3a	Thionic Fluvisols 硫酸塩を含み年間湛水の新しい沖積土壌 細粒質，平担	-	Zg: Gleyic Solonchaks	Mangrove Forest Soil (Acid Sulfate Soil)



SOIL MAP OF PROME AREA

Legend for Soil Map of Prome Area

1. Meadowish Degraded Soils of Indaine Forest

2. Meadow Soils

3. Meadow Gley Soils

4. Newly Deposited Silty Supes Alluvium

5. Swampy Soils

6. Primitive Crushed Stone Soils

7. Dark Yellow Brown Carbonate Forest Soil Turfy Carbonate Soil to 10% Primitive Crushed Stone Soil to 10%

8. Yellow Brown Forest Soil Primitive Crushed Stone Soil up to 10%

9. Yellow Brown Forest Soil Dark Yellow Brown Forest Soil from 25 to 50 %

10. Cinnamon Soil and Turfy Primitive Soil up to 10 %

11. Meadow Alluvial Soil and Swampy Gley Soil from 10 to 25 %

12. Turfy Carbonate Soil and Yellow Brown Forest Soil from 25 to 50 %

14. Mountainous Red Brown Forest Soil Turfy Primitive Soil from 10 to 25 %

15. Shallow Yellow Brown Forest Soil Turfy Primitive Soil from 10 to 25 %

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