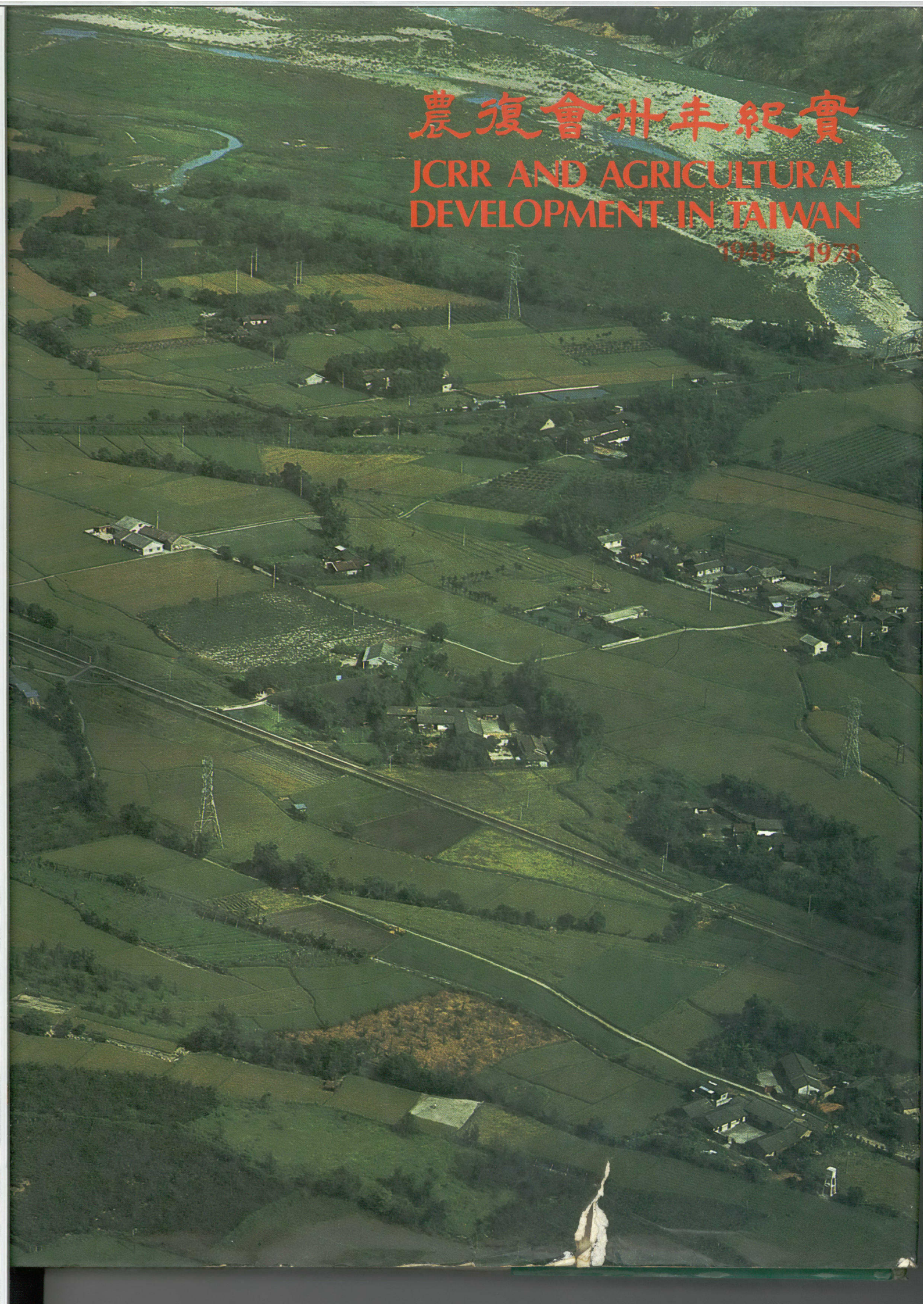

農復會卅年紀實

JCRR AND AGRICULTURAL DEVELOPMENT IN TAIWAN

1948 – 1978

中國農村復興聯合委員會成立卅週年紀念特刊

A THIRTIETH ANNIVERSARY PUBLICATION OF THE
JOINT COMMISSION ON RURAL RECONSTRUCTION

農復會卅年紀實

JCRR AND AGRICULTURAL DEVELOPMENT IN TAIWAN 1948—1978

中華民國六十七年十月
October 1978

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中國農村復興聯合委員會
The Joint Commission on Rural Reconstruction
Taipei, Taiwan, Republic of China

農復會卅年紀實

JCRR AND
AGRICULTURAL DEVELOPMENT IN TAIWAN
1948—1978

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中國農村復興聯合委員會於民國卅七年經中美政府雙方協定，在南京成立，迄今已屆卅週年。農復會成立之初，原係一非永久性的機構，旨在協助我國政府，運用農業科學方法及創新農業制度以從事農村建設。成立後不到一年，因時局的轉變，於卅八年播遷來臺，繼續推展農村復興工作。

回憶農復會遷臺後，當時臺灣的農村，因受戰爭影響，百廢待舉。在此建設期間，農復會曾協助政府實施土地改革與改組農會等方案，並籌辦了許多急要的農村復興計畫。在增產方面，偏重於專家的科技新知，引進新法，以促進農業發展。農復會工作之富有高度彈性，及其特別著重大多數農友的受益，故能靈活運用美援款項，透過政府與民間各執行機構有效地推動各項計畫，使臺灣的農業生產在四十一年時，已大多恢復到戰前的最高水準，並能因應當時人口增加的需要，達到糧食自給自足的境地。

民國四十二年，政府開始實施四年經濟建設計畫，倡導「以農業培養工業，以工業發展農業」的基本政策。農復會受命研擬農業發展計畫，並積極協助政府各級機構推行各項方案，厚植農業建設基礎，使農業培養工業的政策得以順利推行。民國五十四年以後，美國對華經援終止，惟基於農復會工作之重要，經中美雙方政府換文，利用中美經社發展基金，繼續支援農復會各種計畫的推動。

隨着經濟結構的改變，臺灣農業的成長速度漸趨緩慢，與其他產業比較，農民所得亦形相對偏低。行政院蔣前院長鑒於此一情況的嚴重性，即於民國六十一年九月宣佈加速農村建設計畫九項重要措施，於六十二年開始由政府委託農復會籌劃執行，農復會為接受此一新的任務，除以原有人員全力支援外，在計畫重點方面，亦不斷予以調整，如全面規劃農業資源以作最佳有效利用，引用新科技以謀求農業產品產量及品質之再提高，及改進農產品運銷及加工與改善及維護農村環境等，都作了徹底的研究改進。至於推行農業機械化與如何改進家庭農場經營，以謀臺灣農業的現代化及提高農家所得等，更是計畫的重點與問題的中心。在臺灣的經濟結構急速轉變下，農復會的工作已不再限於個別科技計畫的推行與創新，農復會的工作已參與全面經建方案與科技改進的研議、設計與推行。

在過去卅年中，臺灣的經濟結構已自農業為主的形態轉變以工業為主，在這種蛻變的過程中，農業始終扮演着極重要的角色，農復會的全體同仁，也不斷以其熱誠及智慧，協助政府建設農村。臺灣的經濟發展有今日之成就，在國際間已普受重視，農業建設的成功無疑為一大主力，農復會同仁能參加此一建設行列，亦感與有榮焉。

今日臺灣的農村已相當繁榮，問題在於與非農家相比，農家的收入偏低。今日臺灣農村問題已非單純的技術問題，亦不是單純的經濟問題。欲謀臺灣農村問題的進一步改進，除了有效利用農業資源，加強科技研究以增加產量，降低生產成本及有效組織農民推行機械化與加強共同經營、運銷等措施外，亦涉及農業保護政策與有關農地稅捐等新法令的釐訂。

茲值卅週年紀念，農復會發行特刊，以圖片及簡單說明介紹本會的組織與過去工作概況，崇道特為之序，並願與本會全體同仁共勉。

中國農村復興聯合委員會

主任委員　李崇道

Foreword

JCRR was created in Nanking thirty years ago by agreement of the governments of China and the United States. As a non-permanent agency, it was empowered to assist in the rural reconstruction of China through technological and institutional innovation. In 1949, JCRR transferred to Taiwan to continue its program here.

In the initial period of its operation in Taiwan, JCRR concerned itself mainly with the rehabilitation of agriculture which had declined owing to the devastating effects of World War II. Efforts were also made to assist the government in carrying out a land reform program and in reorganizing the farmers' associations. Introduction of new crops and varieties as well as improved farming methods by JCRR specialists featured the endeavors for boosting agricultural production. The high degree of flexibility with which JCRR operated and its stress on distributive social justice enabled JCRR to make proper and effective use of U.S. aid in pushing various projects in cooperation with related agencies and organizations at all levels. By 1952, agricultural production had regained its prewar level and there was enough food to feed the expanding population.

Beginning in 1953, the government put into operation a series of four-year economic development plans under the basic policy of "promoting the mutual support of agriculture and industry in their development." JCRR was made responsible for formulating the agricultural programs of the plans. The successful completion of these programs, for which JCRR gave its full support both technically and financially, greatly strengthened the base of agriculture and helped industrial development. In 1965, U.S. economic aid to the Republic of China was phased out. In view of the importance of the work of JCRR, the Chinese and American governments, through an exchange of notes, agreed to keep the JCRR program going with funds appropriated from a Sino-American Fund for Economic and Social Development.

With the structural transformation of Taiwan's economy, the growth of agriculture began to slow down, and there was a widening gap between the income of farmers and that of non-farm workers. To redress this situation, Mr. Chiang Ching-kuo, the then Premier, announced in September 1972 the government's decision to carry out an Accelerated Rural Development Program (ARDP). JCRR was charged with planning and executing the program which was officially started in January 1973. In performing this task, JCRR has mobilized all the manpower at its disposal and, according to actual needs, made adjustments from time to time in the program emphasis of ARDP. The activities undertaken in the last several years include regional agricultureal planning to optimize resource use, introduction of new technology to produce more products of better quality, improvement of agricultural marketing and processing, and betterment of the agricultural environment. Steps have also been taken under ARDP to extend the use of farm machines and improve family farm management for promoting modernization of agricultural production and raising farmers' earnings. In the fast changing economic circumstances, JCRR no longer confines its operations to individual improvement projects, but has been deeply involving itself in the planning and implementation of national economic plans and science and technological development programs.

During the past three decades, the economy of Taiwan has evolved from an agricultural to a predominantly industrial one. In the process of this change, JCRR has played a significant role, and all members of the JCRR staff have had a share in helping build up the island's agriculture as it is today. The economic achievements of Taiwan, to which the successful development of agriculture has been a key contributing factor, have won international recognition. JCRR takes pride in having participated in the making of this success story.

Rural Taiwan is now already marked by some degree of prosperity. But our farmers still have a low income level compared with workers in other sectors of the economy. The farm problems of today are not purely of a technical or economic nature. The solution of such problems calls for efforts to make better use of the limited available resources, strengthen agricultural research, organize farmers for mechanized farming and joint marketing operations, etc. in order to further increase output and lower the cost of production. Also required are an appropriate price support policy and new legislation dealing with farmland taxation and related matters. These are tasks to which JCRR will apply itself with vigor.

On the occasion of the thirtieth anniversary of JCRR, we are happy to present this book which shows the highlights of our program over the years and also points to the general directions in which agricultural development in Taiwan is progressing.

Robert C. T. Lee
Chairman, JCRR

農復會現任委員

Incumbent Members of the Joint Commission

主任委員　李崇道

Dr. Robert C. T. Lee, Chairman

委員　賴偉恩

Dr. Melvin H. Levine, Commissioner

委員　張訓舜

Mr. Hsuin-shwen Chang, Commissioner

農復會歷任委員

Past Members of the Joint Commission

第一任主任委員

蔣夢麟 博士
Dr. Chiang Monlin
(Chairman 1948-1964)

「農復會之工作，即在應用西方民主思想於中國實際狀況，其指導原則有下列各項：

一、農村大多數人民之福利應首先考慮。

二、計劃必須根據農民最迫切之需要。

三、計劃應在輔導機關輔導下，由人民自行推進，以建設地方。

四、加強地方政府及輔導機關對當地農民之服務。基本原則應爲協助人民自助以解決其迫切之需要，而非自上而下強制人民進行某項工作。此乃民主方法之一種運用。」

摘錄自蔣夢麟先生所著
「農復會工作演進原則之檢討」一書
（民國四十年八月出版）

第二任主任委員

沈宗瀚 博士
Dr. Tsung-han Shen
(Commissioner 1948-1964,
Chairman 1964-1973)

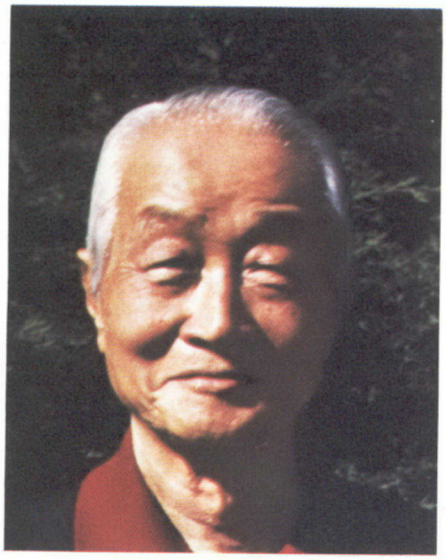
農復會三十週年紀念　　沈宗瀚

本會於民國三十七年十月一日在南京成立。我是五位委員之一。我們推選蔣夢麟先生為主任委員。成立之初，即行商討政策、組織、經費、及組長人選等。以後依照決策推行，頗為順利。三十八年夏，本會遷來台灣，政局穩定，工作進展迅速。

五十三年蔣主任委員逝世。我被選繼任。五十四年美國經援停止。農復會經費由中美農業基金撥付，大為減少，計五十三年度新台幣四億二千四百萬元，較上年度減少一千八百四十萬元；五十四年度又減少六千七百三十萬元。且同時期工商業發展迅速，以致農業生產萎縮，農復會乃加強研究，以謀解決當時農業生產的困難及農民收益的減少。故五十三至六十年是本會艱苦時期。

政府於五十八年宣佈農業新措施，又於六十一年九月行政院蔣院長經國先生宣佈加速農村建設重要措施」並特撥專款二十億元為六十二與六十三年推行經費，由經濟部、農復會與有關政府策劃實施，主要農復會統籌辦理，較農復會本身經費多了數倍，同仁極為興奮，工作大為增加。實施以來，農業生產與農民收益均漸增加，頗顯績效。

六十二年夏，我退休，被聘為顧問，主任委員由本會秘書長李崇道博士繼任，深慶得人。農復會是我工作最久最愉快之處，多年來大家攜手努力，發展農業，博得國內外的贊譽，深感欣慰。值此本會三十週年紀念之日，敬祝本會今後有更大成就，並祝諸位同仁健康快樂。



晏陽初 博士
Dr. Y. C. James Yen
(Commissioner 1948-1950)

IIRR **INTERNATIONAL INSTITUTE OF RURAL RECONSTRUCTION**
1775 BROADWAY, NEW YORK, NY 10019 · TELEPHONE: (212) 245-2680

June 9, '78

Dear Dr. Lee:

I congratulate the members of the ICRR on their outstanding achievements during the last thirty years.

Sincerely

Y.C. James Yen

穆懿爾 博士
Dr. Raymond T. Moyer
(Commissioner 1948-1951)

P.O. Box 15
Sabillasville, Md. 21780
USA
June 21, 1978

Dr. Robert C.T. Lee, Chairman
Joint Commission on Rural Reconstruction
37 Nan Hai Road
Taipei, 107
Republic of China

Dear Dr. Lee:

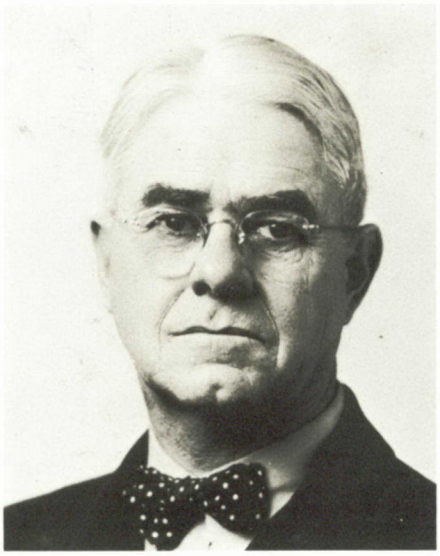
I am glad to respond to your suggestion that I send a short statement on the occasion of celebrating the thirtieth anniversary of the JCRR.

One of the remarkable things about the JCRR is that, after thirty years, it is still alive and performing a major function in the continuing development of Taiwan's agriculture and rural life. Those of you responsible are to be congratulated.

The passing years, too, have made all the more remarkable the wisdom in the concept of rural development that the JCRR helped to pioneer, and the determination of the government to carry out the social as well as the technical aspects of the program that has led to. Deservedly, that program still draws wide attention.

What remains most vivid to Mrs. Moyer and me personally, though, is the experience of those days working jointly on programs in which all of us believed. I occasionally find some who seem still to agree with Kipling that "East is East, and West is West, and never the twain shall meet". They are wrong. In the whole of our experience during those challenging times the twain met. We still think this one of the richest experiences of our lives.

Cordially,
Raymond T. Moyer



貝　克 博士

Dr. John Earl Baker

(Commissioner 1948-1952)

菲　平 先生

Mr. William H. Fippin

(Commissioner 1951-1957)

Castle, Florida
April 22, 1978

To J.C.R.R. on its Thirtieth Anniversary, Greetings—

I know of no organization that has served the rural people of Free China, and many other countries around the world, in as capable, associative and dedicated fashion, or can show more tangible results for its expenditures in time, personnel and money. It is a tribute to its leadership and staff that, over the years, it has adhered so faithfully and well to its founding guidelines, policies and procedures, while preserving flexibility in program content and emphasis. I consider my association with J.C.R.R. to have been the happiest and most productive of my professional life. My most sincere congratulations and best wishes to you all.

With fond regards,

William H. Fippin

錢天鶴 先生

Mr. T.H. Chien

(Commissioner 1952-1961)

戴維斯 先生
Mr. Raymond H. Davis
(Commissioner 1952-1959)

Wichita, Kansas
May 24, 1978

Dear Mr. Lee,

Mr. Davis was very happy to send you his picture and a statement concerning the Thirtieth Anniversary of JCRR.

I don't know whether you have heard that Mr. Davis has had numerous strokes, so it is very hard for him to put the right words together.

I hope you will feel free to make corrections or delete some sentences if his statement is too long.

Our Best Wishes to all,
(Mrs) Hazel Davis

It was in the year of 1952 that I joined this unique organization, the Joint Commission on Rural Reconstruction.

I recall that it was a most happy occasion when the Tenth Anniversary was celebrated.

The Thirtieth Anniversary of the Joint Commission on Rural Reconstruction should be a most joyous occasion.. remembering that Taiwan has not only become self-sufficient, but has become a large supplier for many exports of Agricultural Commodities.

We are confident that the Joint Commission on Rural Reconstruction will continue to make progress in the years ahead.

威爾遜 先生
Mr. Clifford H. Willson
(Commissioner 1959-1961)

June 15, 1978

Mr Robert C. T. Lee
Chr. J. C. R. R.
Taipei - Rep of China

Dear Mr Lee:

Congratulations on thirty years of highly productive operations and best wishes for many more years of the same by the J. C. R. R. I was in China thirty years ago when J. C. R. R. was organized and have followed its work closely since my last active participation was as consultant to the Conference on the Establishment of the Asian Vegetable Development Center in 1968. Its Reports are still read with interest. The J. C. R. R. continues an outstanding organization for leadership and demonstration of governmental cooperation.

Sincerely Yours
C. H. Willson

葛威廉 先生

Mr. William J. Green

(Acting Commissioner 1961-1962)

6126 Martel Avenue
Dallas,Texas 75214
U.S.A.
June 2,1978

Dr.Robert C.T.Lee
Chairman,JCRR
37 Nan Hai Road
Tapiei,Taiwan
Republic of China

Dear Dr. Lee,

Thanks for your letter announcing the celebration of the 30th Anniversary of JCRR in October,and inviting me to send a message and picture. I am happy to do so.

I arrived in Taiwan on Feb.15,1957 and left on June 28,1962. I went there to be Chief of the Agricultural Extension Division of JCRR. At that time there were three Chinese and two American Commissioners. About two months after I arrived,Bill Fippen,one of the American Commissioners was transferred to Vietnam. I was appointed acting commissioner,and served in that capacity in addition to chief of AED until I left Taiwan. During that period,I was the only American commissioner for about two years.

I shall always regard my 5 1/3 years with JCRR as one of the most interesting periods of my life. To start with,I was very happy to be working with so many old friends of UNRRA days in China,including among many others Chairman Chiang Mon-lin,Commissioners T.H.Shen and T.H. Chien, and Division Chiefs Paul Ma and James Hunter. In a short time, I became acquainted with the other people and enjoyed working with them. I have often said that some of the best friends I have in the world are in China.

Much of the success of JCRR is due to the type of organization where Chinese and American officials and technicians worked shoulder to shoulder as co-workers . In my estimation it was the most effective means ofplanning and carrying out a program of agricultural improvement and rural development. I am most happy to have had some small part in it. Also,it is with a sense of great satisfaction that I have noted the wonderful progress JCRR has continued to make in recent years.

While I was with JCRR,I helped celebrate its 10th anniversary,and it was my good fortune to be able to return for the 20th. I would like very much to be back for the 30th,but I fear that will not be possible because of my poor eyesight which makes it difficult to travel by myself. If I am not there,you may know th t I am with you in spirit if not in person. My best wishes go to all my old friends and to the many new workers for the continued success of JCRR.

Sincerely,

William J.Green

郝夫曼 博士
Dr. Gerald H. Huffman
(Commissioner 1962-1968)

1100 So Orlando Ave
Maitland, Fla
April 24, 1978

Dr Robert C T Lee
Chairman,
JCRR
Taipei, Taiwan, ROC

Dear Robert,

I appreciate very much being asked to prepare a handwritten note for inclusion in JCRR's thirtieth anniversary special publication.

As you know it was my privilege to serve as the JCRR American Commissioner from June, 1962 to the early part of March, 1968 as I look back upon my professional life, spent primarily in my native State of Illinois, Washington, DC, Europe, Taiwan and Vietnam, I can say without reservation that my nearly six years of association with JCRR and with the Chinese people on Taiwan, were the most enjoyable and valued years of my life and professional career.

I may have contributed to JCRR's effectiveness in some small way during my sojourn in Taiwan; but I received much more in the form of new knowledge, useful experience, love and affection from my JCRR associates and other Chinese friends. Consequently, JCRR and Taiwan provide only pleasant memories since they contributed so immeasurably to the richness of my life.

I congratulate JCRR on its long and useful time as a major contributor to the economic advancement of the Republic of China in general and of the rural population of Taiwan in particular. I cordially wish for all present and retired JCRR staff an enjoyable and happy celebration as you mark your 30th birthday in October. As an American I am most proud of JCRR as a unique and successful joint venture between the people of the Republic of China and the people of the United States.

Cordially yours,

G H Huffman

畢林士 博士
Dr. Bruce H. Billings
(Commissioner 1968-1972)

To be part of JCRR is a wonderful experience. You are an inspiring group to work with and I miss all of you. I will do all I can to keep the "joint" in JCRR.

Bruce Billings

柯雷克 博士
Dr. Chester W. Clark
(Commissioner 1973-1975)

It was an honor and a privilege to have had the opportunity to serve as the American Commissioner on the Joint Commission on Rural Reconstruction.

My service allowed me to observe the interrelated series which had resulted in the recognition by the free nations of the world of the exemplary achievements of JCRR.

The dedicated professionalism of all the members of the staff was directed to the national objective of an adequate supply of nutritious food for all the citizens of the Republic of China. The JCRR professionals have an attitude of reasonableness and flexibility which resulted in an atmosphere of willingness to support suggested new approaches when these gave promise of a contribution to the national objective. The presence of barriers in the way of achieving their goals appeared to act as a continuous stimulus to the staff. However none of these efforts would have led to the recognized achievements were it not for the ability of the staff to work directly and harmoniously with their countrymen at all levels from the Central and Provincial Governments down to the Farmers Associations at the local level and with the farmers in the field.

Besides the recognized professional and technical accomplishments of JCRR, we greatly esteemed the opportunity to live and travel with and among the Chinese people. We were deeply impressed by their intelligence and desire to work hard, and we enjoyed their genuine friendliness and fine sense of humor.

We hope that the friendships we were fortunate to make will endure.

Chester W Clark
American Commissioner
1973-1975

蔣彥士 博士
Dr. Yen-si Tsiang
(Commissioner 1961-1978)

農復會成立迄今正逢三十而立之年，我在本會服務的時間，也有三十個寒暑。回想民國卅七年的時候，中美兩大盟邦的政府，在南京創設了這個典型的合作機構，藉以因應我國中國廣大農村的重建工作。其時我在中央農業實驗所擔任雜糧特作組主任。本會首任主任委員蔣夢麟先生和其他四位中美委員為此一新設機構招兵買馬，要我出任技正兼委員會秘書，不久又於我升任為秘書長。從這一紮根下去，後來雖曾迭奉政府徵調，擔負會外的其他工作，但仍兼著本會委員職務。後雖因擔任經濟部秘書長而辭去本會委員，但委員會還是給我一個顧問名義，時備諮詢。因此三十年來可以說我一直都是農復會的一員，親自看著它從抽苗、茁壯而成長繁茂，深感榮幸！

農復會在這悠長的三十年間，由於歷任主持者的卓越領導以及全體同仁的通力合作，對於我國農業技術的改進、農村經濟的繁榮、農民生活的改善，都曾提供了很大的貢獻；尤其值得稱道的，就是由於我國農民大家的勤奮自助精神，更能促使農復會工作的開展突飛猛進，因而造就了非凡的成功，舉世譽為奇蹟。

農復會獲致成功的因素，以我的體會所及，概括說來，約有下列幾項：

其一，是工作目標正確：以增加農業生產，提高農民生活水準作為本會工作的努力指標。

其二，是農民本身勤奮：大家都能在本會和政府有關機關的指導協助下，應用新的科學技術，努力生產。

其三，是各級政府機關都能抱為民服務之精神，協力合作。

其四，是根據民生主義的均富政策，最先協助政府實施土地改革，為整個社會經濟建設工作奠定了深厚的基礎，使農、工、商各業獲得均衡發展，於是農業本身同受其惠。

其五，是重視試驗研究。工作方法由點而線，由線而面，亦即試驗—示範—推廣，確實有效。

其六，是協力健全農民組織。如農會、漁會、合作社、水利會等，都陸續輔導其改組建制，並不斷加強其功能。

其七，是本會的委員和專家們，都能合作無間，為共同目標而努力。

其八，是本會人事及會計制度，精簡而富彈性，故能配合工作，收效迅速。

其九，是本會不斷培植人才，促進新陳代謝。一本會技術專家的平均年齡，三十年來每年都是在四十歲上下，可說精壯而又富經驗，足以迅赴事功。

上述數端，便是農復會之所以成功的道理。但是我們決不能以此而自滿。展望未來，我國農業建設方面有待推展加強者正多。農復會今後仍應本著一貫的信念和目標，在配合政府的決策，協助農業主管機構，鼓勵農民大眾，從事於各種興革事宜。在台灣農業資源有限而人口持續增加的情形下，農復會近數年來竭力推行的農業資源調查規劃、山地與漁業資源的開發利用、農業研究與推廣的配合加強，以及農業機械化的積極實施等等，都不失為因應當前經濟建設需要的最佳途徑。循此繼續和工商業一同發展下去，相信必能達到民富國強的境界！

蔣彥士撰 民國六十七年九月

蓋哲甫 博士
Dr. Joseph B. Kyle
(Commissioner 1976-1978)

September 1, 1978

Dr. Robert C. T. Lee
Chairman, JCRR
37, Nanhai Road
Taipei, Taiwan
Republic of China

Dear Robert:

Within the past decade the Republic of China has become one of the most industrialized of the developing nations. This industrialization would not have been possible without the existence of a strong agricultural sector. JCRR has played a vital role in insuring that industry and agriculture developed in unison in land. The assistance JCRR has provided to the farmer has been effectively administered and utilized and any project or activity with which JCRR has been associated has had the benefit of the Commissioners, trained and dedicated staff.

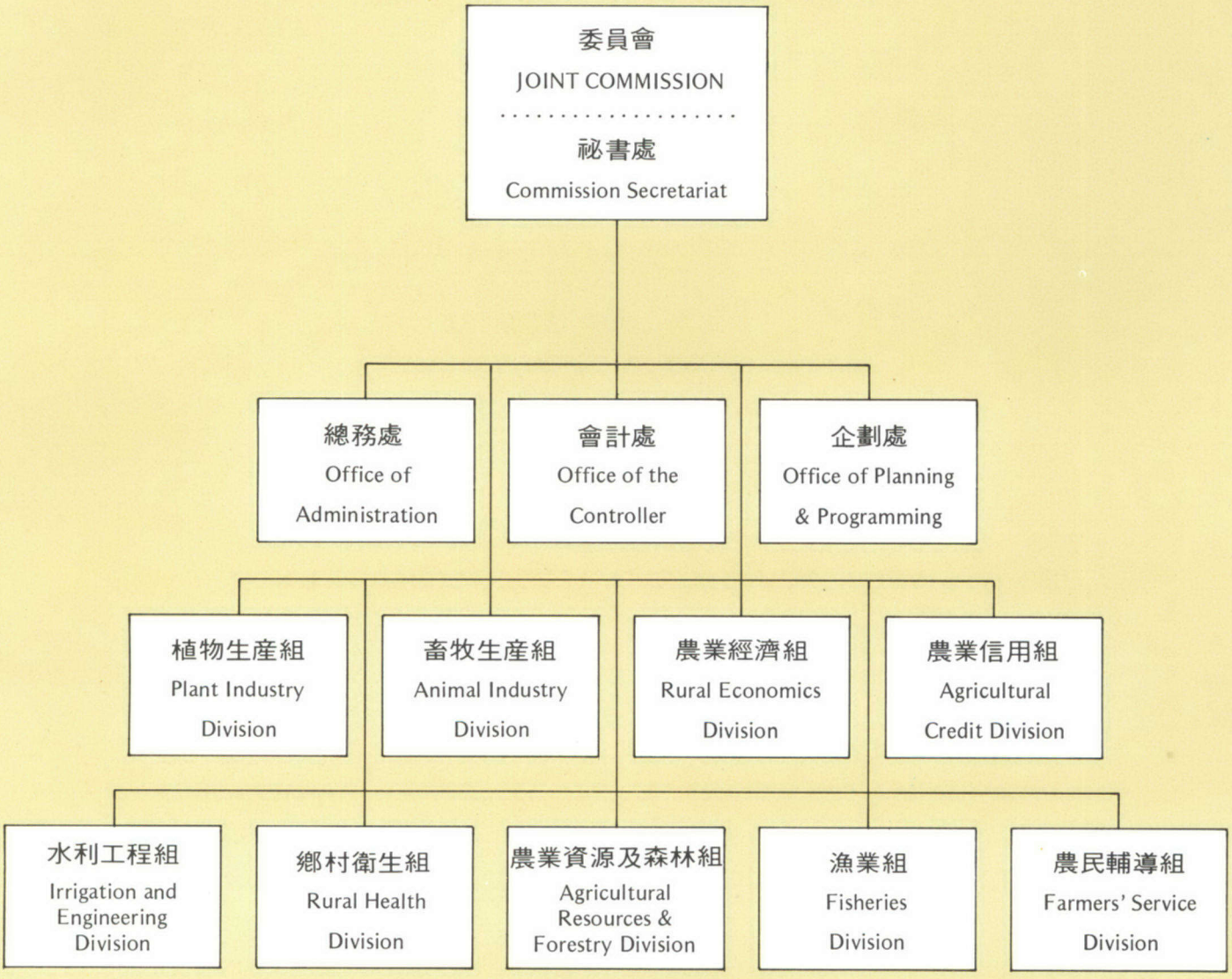
I am deeply honored to have been given the opportunity to serve as the United States Commissioner on JCRR during the period March 1976 to September 1978. The many people who have been associated during the past thirty years can take pride in having worked with an organization which has made a significant and unique contribution to the development of the economy of the Republic of China.

With best regards,

Sincerely,
Joseph B. Kyle

農復會組織
Organization of JCRR

農復會組織表
ORGANIZATION CHART



農復會顧問

Advisers and Consultants

沈宗瀚	博士	Dr. Tsung-han Shen
蔣彥士	博士	Dr. Yen-si Tsiang
陳同白	先生	Mr. Tung-pai Chen
許建裕	先生	Mr. Chien-yu Hsu
章元羲	先生	Mr. Yuan-hsi Djang
傅安明	先生	Mr. An-ming Fu

農復會各單位主管

Principal Officers

祕書長	王友釗	Dr. You-tsao Wang, Secretary-General
副祕書長	黃正華	Mr. Cheng-hwa Huang, Deputy Secretary-General
副祕書長	葛錦昭	Mr. Chin-chao Koh, Deputy Secretary-General
會計長	沈葆彭	Mr. Paul B. Shen, Controller
總務長	石本素	Mr. Spencer Shih, Administrative Officer
企劃處處長	熊中果	Mr. Chung-kuo Hsiung, Chief, Office of Planning & Programming
植物生產組組長	孫明賢	Dr. Ming-hsien Sun, Chief, Plant Industry Division
水利工程組代理組長	章元羲	Mr. Yuan-hsi Djang, Acting Chief, Irrigation & Engineering Division
鄉村衛生組組長	張坤崗	Dr. Kung-kong Chang, Chief, Rural Health Division
畜牧生產組組長	鍾　博	Dr. Po Chung, Chief, Animal Industry Division
農業資源及森林組組長	戴廣耀	Mr. Kwang-yao Tai, Chief, Agricultural Resources & Forestry Division
農業經濟組組長	毛育剛	Dr. Yu-kang Mao, Chief, Rural Economics Division
農業信用組組長	吳元德	Mr. Yuan-teh Wu, Chief, Agricultural Credit Division
漁業組組長	闕壯狄	Mr. Chuang-ti Chueh, Chief, Fisheries Division
農民輔導組組長	楊玉昆	Mr. Yu-Kun Yang, Chief, Farmers' Service Division

農復會與台灣農業發展

JCRR and Agricultural Development in Taiwan

農復會的起源與組織

中國農村復興聯合委員會（簡稱農復會）爲中美兩國政府聯合設置的一個機構，於民國三十七年十月一日在南京成立，負責策劃並推行我國戰後農村復興工作，經費由美國對華經濟援助款額中提供。三十八年八月，農復會隨政府遷至臺灣繼續推動農村復興工作。民國五十四年，美國結束對華經援後，中美兩國政府換文設置中美經濟社會發展基金，農復會的經費改由此項基金支付，除執行本身工作外，並協助政府制訂農業政策及推動各項農業發展計畫。三十年來，農復會的工作，均以切合實際需要、裨益農民爲主，收到相當績效。

農復會在組織上採用委員會制度，委員會決定政策及工作方針。在美援時期共有委員五人，其中中國委員三人，美國委員二人；美援停止後，中美委員各減一位。委員會下設秘書長，負責綜理會務，並分設技術及行政兩個部門；技術單位稱組，行政單位稱處。爲配合實際需要，農復會的組織屢有調整；三十七年成立之初，技術部門爲四組，職員約四十人，以後因工作範圍不斷擴大，組處數目亦逐漸增加。目前共有四處九組，分別爲秘書處、總務處、會計處、企劃處以及植物生產組、水利工程組、鄉村衛生組、畜牧生產組、農業資源及森林組、農業經濟組、農業信用組、漁業組及農民輔導組，職員共二百五十餘人。

1. 農復會辦公大樓。
   The JCRR Building in Taipei.

2. 民國三十七年農復會成立時的五位委員。
   左起：貝克、蔣夢麟(主任委員)、沈宗瀚、穆懿爾及晏陽初。
   The five original members of the Joint Commission.
   From left: Dr. John E. Baker, Dr. Chiang Monlin (Chairman), Dr. T. H. Shen, Dr. Raymond T. Moyer and Dr. Y. C. James Yen.

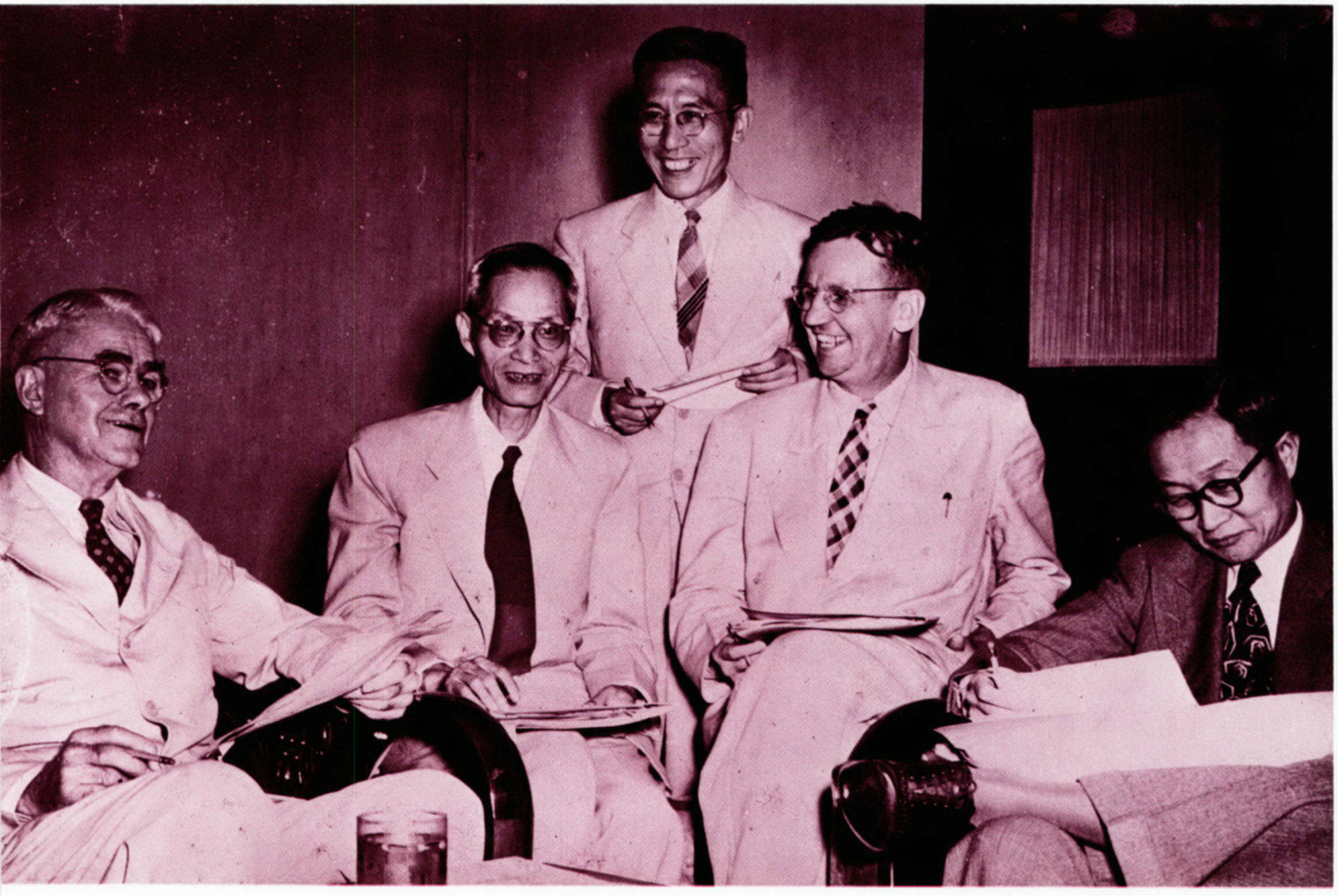
1

JCRR – ITS ORIGIN AND ORGANIZATION

The Chinese-American Joint Commission on Rural Reconstruction (JCRR) was established in Nanking on October 1, 1948 under the 1948 U.S. China Aid Act as a bilateral agency authorized to formulate and carry out a coordinated program for reconstruction in rural areas of postwar China.

In August 1949, JCRR moved to Taiwan with the government to continue its work in this island province of the Republic of China. After the termination of U.S. economic aid to China in 1965, JCRR has been operating with funds appropriated on an annual basis from a Sino-American Fund for Economic and Social Development (SAFED) which was created out of the residual accumulated counterpart funds generated by the sale of U.S. aid commodities on the local market. Over the years, besides carrying on its own activities, JCRR has assisted the government in formulating national agricultural policies and implementing various agricultural development programs.

The governing body of JCRR is the Joint Commission which, composed originally of five and now of three Commissioners (two Chinese and one American), makes policy decisions and exercises general supervision over the JCRR program. The Joint Commission is assisted by a Secretary-General who serves as the chief executive officer of JCRR. Several changes have been made during the past years in the organization structure of JCRR to cope with the needs of the times. Today, in addition to a Commission Secretariat, there are three administrative offices (the Controller's Office, the Office of Administration and the Office of Planning and Programming) and nine technical divisions in charge, respectively, of plant industry, irrigation and engineering, rural health, animal industry, agricultural resources and forestry, rural economics, agricultural credit, fisheries and farmers' service, with a total staff of over 250.



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農復會的基本工作原則

農復會爲中美兩國合組的機構，其性質、功能及職責與一般政府機構稍有不同，但其基本精神則係依據農村及農民的需要，倡議新的制度與方法，並從事新技術的引進、發展與改良，經以實際的計畫求證獲有成果後，協助有關農業機關予以推廣。因此，農復會的工作方針及原則如下：

一、提供協助以配合農民實際需要爲優先，不論計畫如何健全，倘不爲農民所需要，卽不予實施。

二、推行農業增產工作，在求利益的公平與均衡分配，避免僅爲少數農民或團體謀求利益。

三、選擇對農村工作具有良好基礎及經驗的機構，給予經費及技術協助，推行合作計畫，以求充份發揮各項協助的效用。

四、任何計畫與工作均先進行試驗與示範，經確定可行後再擴大推廣。

三十年來，由於社會經濟情況的改變，農復會的政策與措施亦時有變動，但始終以前述四點基本原則作爲最高指導方針，並以「自助人助」的精神配合技術及資金的援助，發揮「觸媒」的作用，以達成提高生產增進全民福祉的目的。

JCRR'S OPERATING PRINCIPLES

Basically, in endeavoring to increase agricultural production and promote rural development in Taiwan, JCRR lays emphasis on innovative and pioneering types of projects designed to effect desirable institutional changes as well as technological improvements, the latter for extension to farmers after their practical value is established through research and experimentation.

Four principles have guided JCRR operations throughout the last 30 years:

1. There must be a felt need for JCRR services on the part of farmers themselves, who are after all the direct beneficiaries of the projects.

2. There must be a fair distribution of the benefits that are derived from the JCRR projects.

3. There must be a sponsoring agency qualified to undertake any given JCRR project and to utilize JCRR assistance effectively.

4. There must be a demonstration of feasibility of any particular JCRR project before undertaking its broad expansion.

農復會委員會每週舉行一次會議，商討重要工作計劃及會務。左起：秘書長王友釗、美籍委員賴偉恩、主任委員李崇道、委員張訓舜、委員會秘書郝寶群。

The Joint Commission in session. From left: Dr. Y. T. Wang, Secretary-General; Dr. Melvin H. Levine, American Commissioner; Dr. Robert C. T. Lee, Chairman; Mr. H. S. Chang, Commissioner; and Miss Cecilia Ho, Secretary to the Joint Commission.

The role played by JCRR in agricultural development has been that of a catalyst. By providing technical and some financial assistance, JCRR has been able to give direction to agricultural policies, encourage better methods of project implementation, motivate projects difficult to initiate, and generate a spirit of self-help among the farmers and local agencies.

JCRR OPERATIONS IN TAIWAN

In a span of three decades, Taiwan has turned from a backward colonial economy into a thriving, self-sufficient society as a result of the concerted efforts of the people and the government. Agriculture has played an important part in bringing about this "economic miracle," and so has JCRR in making Taiwan's agriculture one of the most advanced in the developing world.

The economy of Taiwan suffered severe damage during World War II. In the immediate postwar years, with the large influx of people from the mainland, there was a general shortage of food and other necessities. To maintain social stability, the government gave top priority to the rehabilitation of agriculture, especially in regard to the production of rice, the staple crop. A series of measures including repair and construction of irrigation facilities, supply of improved seeds, and import of chemical fertilizers were brought into effect with JCRR technical and financial support. By 1952, agricultural production had largely regained the prewar peak levels.

蔣總統經國先生擔任行政院長時在農復會聽取工作簡報。

A briefing on JCRR activities for Mr. Chiang Ching-kuo, formerly Premier and now President of the Republic of China.

農復會三十年來工作概要

臺灣自光復以來，由於人民一致的努力與政府推行一連串政策的成功，整個經濟發生了根本的變化，由一個落後殖民地式的經濟形態，轉變爲目前自立自主生氣蓬勃的社會。

在此一被世界各國譽爲「奇蹟」的經濟發展過程中，農業部門的貢獻極大；而在農業發展過程中，農復會亦扮演了一個重要的角色。

二次世界大戰期間，臺灣經濟曾受嚴重的破壞。光復初期，物資供應極爲缺乏，加以人口快速增加，供求更不平衡，因此物價波動劇烈，人心不安。在這種情形下，政府的首要工作爲增加糧食生產以安定社會。水稻爲臺灣最主要的作物，故當時所採取的各項增產措施，多以促進稻米生產爲主。諸如興修水利、恢復灌溉系統、提供優良稻種、分配化學肥料及有機肥料的製造等，均列爲重要政策措施。農復會在此方面，不僅協助政府創立了甚多有效的制度，並提供資金與技術援助，加速恢復農業生產。至民國四十一年，臺灣農業生產已恢復至戰前最高水準。

除農業增產措施外，農復會並協助政府從事農村社會制度的改革。在租佃制度方面，首先於民國三十八年實施三七五減租，以減輕佃農的負擔，改善佃農的社會地位，同時改變一般人依賴土地的觀念。其後於民國四十年實施公地放領，再於民國四十二年實施耕者有其田政策，扶植佃農成爲自耕農，改變了我國傳統的農村租佃結構。土地改革的成功，直接使四十六萬七千餘戶農民受益，也刺激了農業的增產。爲協助政府推行土地改革措施，農復會特成立土地組，積極參與基本地籍資料的建立以及土地總歸戶等措施辦法的研訂與實施，並在經費上給予必要的協助。

臺灣原有豐富的森林資源，惜在二次大戰期間遭受濫伐，甚多林區林相衰退，林木蓄積量減少，沿海地區的防風林亦多遭破壞。農復會於遷臺翌年成立森林組，積極協助政府從事林業建設工作，初期以擴大復舊造林及重建耕地防風林爲重點，使臺灣森林逐漸恢復舊觀，沿海地區廣大面積的耕地在防風林保護下得以維持正常生產。

此外，農復會並研擬農民組織的改革方案，建議政府採行，以加强農民團體對農民的服務及維護農民利益。臺灣省各級農會的組織因而獲得確立。臺灣的農會爲一多目標的組織，爲農民提供推廣、運銷及信用等服務，同時亦爲農民與政府間的一個重要的橋樑。

在鄉村衛生改善方面，農復會早期工作重點在協助興建簡易自來水設備及預防與撲滅傳染病，並建立各種保健醫療制度，提高鄉村居民的生活水準。又鑒於當時人口壓力的嚴重及對未來經濟發展的威脅，農復會首先倡導家庭計畫，在農村中默默推行。

農業生產的增加，充裕了糧食供應，平抑了物價波動，穩定了工資水準；農村保健制度的建立，改進了農民生活環境；土地改革的成功，改善了農村社會結構，增加了社會各階層的和諧，同時將地主的有用資金由農村土地轉移於工業生產，爲進一步的經濟發展紮下了根基。自四十二年起，政府開始推動長期經濟建設計畫。

民國四十二年至五十七年，政府實施了四期四年經建計畫，在「以農業培養工業，以工業發展農業」的基本政策下，將臺灣的經濟帶進了一個新的境界。在此期間，農業一方面提供工業發展所需的資金與原料，另一方面，廣大的農村亦構成了工業產品的重要市場。由於農業爲當時經濟中最重要的部門，農業計畫的擬訂關係整個經濟計畫的成敗。此項工作即由農復會擔任，在計畫定案後，農復會又負起協助推動的重任。

在一連串的四年經建計畫期間，增產仍爲農業發展的首要目標，而以提高土地的生產力作爲增產的主要手段。由於當時農村勞力充裕而土地資源有限，農業生產多採用勞力集約的精耕方式經營，複作指數不斷提高；此種在同一塊土地上進行連續栽培的方法，受到甚多國家的重視，使臺灣的精耕農業制度聞名世界。

在臺灣的農業發展過程中，農民組織發揮了極大的功能。農會所推動的農業推廣教育，提高了農民的生產技術；農會所提供的各種生產資材與農貸，使農民的生產計畫得以順利實現，而農復會的專家則爲農會各項服務活動的後盾與强大的支持者。

技術改良爲增加產量及改進品質的重要動力，灌溉系統的建立，新品種的培育與引進，新興作物的發展，病蟲害的防治，家畜傳染病的消除，以及化學肥料的有效使用等，對於農業生產量與質的改進都有甚大幫助。農復會由於在推動農業技術革新方面的成就而享譽國際。

新興作物如洋菇、蘆筍及各種果蔬的成功發展，不僅有助於農業的持續成長，且導致了臺灣農產品加工外銷事業的勃興。飼料及品種的改良，配合人工受精技術的推廣，使毛豬的數量及品質都有甚大的改進。由於遠洋及養殖漁業的發展，漁獲量大幅增加。漁業與畜牧的不斷成長，使臺灣的農業得以突破土地資源的限制而繼續推進。

爲了解臺灣森林資源及土地利用情形，農復會於民國四十三年至四十五年間，在美國農業部技術協助下，與我國大學及林業機構合作利用航空測量技術全面調查臺灣森林資源及土地利用狀

JCRR also undertook to assist the government in carrying out land reform in Taiwan. A farm rent reduction program was put into operation in 1949 to reduce the financial burden of tenant farmers. It was followed by the sale of public lands in 1951 and the land-to-the-tiller program in 1953 to make tenants owner-cultivators. These measures benefited more than 467,000 farm families and thus gave them a strong incentive to increase production. To help implement the reform work, JCRR specially created a Land Division which participated in planning, training of personnel, conduct of cadastral surveys and other related activities.

Reckless cutting during the wartime greatly depleted Taiwan's forest resources. With the establishment of its Forestry Division in 1950, JCRR began to provide assistance to both governmental and private agencies for reforestation and windbreak planting to increase the growing stock and protect crop production in coastal areas.

Another aspect of the JCRR program in the early years involved the reorganization of farmers' associations. On JCRR recommendation, the government took steps to improve their organizational structure and strengthen their services in the interests of farmers. The FAs of today, which provide a variety of services including extension, supply, marketing and credit, function as a bridge between the government and farmers.

In the field of rural health and sanitation, JCRR helped build simple water supply systems, control infectious diseases and set up health care systems. In view of the mounting population pressure, JCRR also initiated family planning in rural areas.

The series of agricultural programs undertaken by the government in 1949-1952 with JCRR technical and financial assistance laid the groundwork for further growth of the economy of Taiwan. Beginning in 1953, the island's economic development was put on a planned basis.

Between 1953 and 1968, four four-year economic plans were carried out consecutively under the general policy of "promoting the mutual support of industry and agriculture in their development." In this period, agriculture as the premier sector of the economy supplied funds and raw materials to a budding industry and rural areas became a major market for industrial products. JCRR had taken an active part in the formulation and implementation of the agricultural programs of all these plans.

The chief target of the four-year plans for agriculture remained the increase of production, which was achieved mainly by raising land productivity. Labor-intensive farming was the order of the day because of the abundant rural labor supply. Multiple cropping systems, by which several crops can be grown in a year on the same piece of land, were developed and widely practiced by farmers during this period.

Farmers' organizations had an important share in the success of agricultural development. The farmers' associations, through their agricultural extension activities, helped upgrade production techniques, and their timely supply of farming requisites and loans facilitated the execution of production plans at the farm level. Backstopping the extension and other services of the FAs was the technical expertise provided by JCRR specialists.

Technical innovations including new varieties and crops, improved cultural techniques, better methods of irrigation and fertilizer application, and more effective pest and disease control contributed to the yield increase and quality improvement of farm products. JCRR became known internationally for its role in the promotion of technological advancement in agriculture.

The successful development and extension of new crops such as mushrooms and asparagus not only made sustained agricultural growth possible but also led to the expansion of Taiwan's agricultural export trade. The supply of balanced feed and improved breeds together with artificial insemination revolutionized hog production, and there was a continued rise in fish catch as a result of the progress made in the development of deep-sea fisheries and fish culture. Owing to the rapid growth of the livestock and fishing industries, agricultural production as a whole was able to move ahead unimpeded by the scarcity of land resources.

To take stock of the forest resources and find out the land-use conditions in Taiwan, JCRR enlisted the help of the U.S. Department of Agriculture in initiating a project for an island-wide aerial survey which was executed by the Taiwan Forestry Bureau and other related organizations between 1954 and 1956. The data obtained have since served as a useful guide in agricultural resources planning. Photogrammetry was introduced under this project. In recent years, JCRR has also undertaken to introduce the remote sensing technology and promote its application in inventorying, planning, utilization and monitoring of natural resources.

In the early stages of Taiwan's economic development, agricultural exports accounted for about 80% of the total annual export value; most of the industrial machinery and raw materials were purchased with foreign exchange earned by the export of farm products. Owing to increased farm production, the earnings and purchasing power of the rural people greatly improved. This promoted the growth of light

況。多年來，此項調查資料曾廣爲政府及民間利用，作爲農業資源規劃的依據。同時航測技術亦自此正式引進我國。近年來又進一步發展遙感探測技術，對各項資源的清點、規劃、利用和動態監視，都有高度的績效。

在臺灣經濟發展的初期，農產品的輸出佔出口總值的八〇%以上，甚多工業所需的機器與原料都是以出口農產品所換取。農業增產提高農民的收益，增加了農民的購買力，進而帶動輕工業的發展，使臺灣經濟提早完成「進口替代」的發展階段。

特別值得一提的是，在培養經建領導人才方面，農復會自民國四十年起即選派在農工建設方面具有領導潛力的青年至國外受訓，參與這項訓練的人員，現多在政府各階層擔任重要工作，成爲國家的中堅。

自民國四十二年開始實施第一期四年經建計畫，至五十七年第四期四年經建計畫完成爲止，臺灣的經濟經過十六年來的持續成長，增進了全國人民的福利，也改變了經濟與社會的基本結構。在此發展過程中，農復會的工作重點與方向亦爲配合整個經濟發展情勢的需要而經過多次調整。

民國五十八年爲臺灣農業發展的轉捩點，因自該年以後，農業勞動力即逐年減少，農業經營面臨一個新的局面。在第五期四年經建計畫中，農業政策的重心已由土地生產力的提高轉變爲農業勞動力的改善，而以增加農民所得爲目標。六十五年起實施六年經建計畫，農業政策仍然依循此一方向，但其中林業政策則有劃時代的改變，以造林保林重於砍伐，確保水土資源與國家未來的利益。

隨着經濟結構的改變，農業部門本身亦發生甚多變化，如勞力集約程度下降，生產成長速度減緩，農民所得相對偏低等。因經濟快速發展所引起的種種農業問題，在民國五十年代末期已受普遍的重視。六十一年九月，當時的行政院蔣院長宣佈實施加速農村建設計畫，並由政府委託農復會策劃執行，加速農村建設計畫的目的不僅在增加農業生產，同時亦希望藉此調整農業生產結構與經營方式，促進農業現代化，以適應未來的經濟發展情勢。農復會以原有人員承擔起此一新的使命。

由於農業勞動力的減少及農業結構的變化，農業生產因素必須予以重新配合，資本逐漸代替勞力，農業生產逐漸由勞力集約轉變爲資本集約，農貸制度的改善與農業機械的推行成爲加速農業發展的重點。農復會早在民國四十三年時即已開始推動農業機械化，對農機的引進與改造、農機的使用示範及推廣，以及農機貸款資金的配合，歷年來不斷給予經費支援及技術協助，使臺灣農業機械化達到目前的規模。

農業機械與人力勞動不同，其效率的高低與農場規模具有相當關係。爲提高農業勞動生產力及農民所得，農場經營規模必須予以擴大，加速農建計畫特別強調農業共同經營及農產專業區的建立，促使小面積的家庭農場能在有計畫的組合中獲得大規模經營的利益。

經濟發展的結果，使市場活動日趨活躍，農產品商品化的程度隨之增加，農場生產的目的已不再僅爲求取自給自足，而以最大利潤爲目標。由於利潤的大小取決於生產成本與市場價格，加速農建計畫的另一項措施爲改進運銷制度，減少中間運銷層次以增加農民收益。

促進農業資源的合理利用爲今後農業發展的重要課題，農復會在加速農建計畫項下特展開農業區域規劃的工作，先行瞭解農業資源的分配情形，再逐步推行適地適作政策，以達到地盡其利的最終目的。

在加速農建計畫推動期間，政府每年撥出資金約二十億元，並以相當部份用於農業基本建設，如海堤及產業道路的興建等，以增加農、林、漁、牧各部門的生產效率，並培養未來的發展潛力。經過四年餘的努力，投資效益已漸顯著，農村經濟亦有相當改善，臺灣的農業發展又向前邁進一大步。

農業發展是動態的，新的問題將不斷發生。農復會全體同仁將繼續遵循國策及依照本會基本工作原則，以自助人助的精神，努力開拓新的領域，隨時準備應付新的挑戰。

industries and hastened the economic "takeoff" of Taiwan.

Worthy of special mention is the JCRR effort, which began as early as 1951, to select young men of leadership quality for advanced training abroad. Most of the returned trainees now hold responsible positions in the government service.

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The economy of Taiwan progressed steadily during the course of the four four-year economic plans, which resulted in improved living conditions of the people and caused some fundamental changes in the economic and social structures. There were also readjustments and modifications in the JCRR program necessitated by the changing circumstances.

A turning point in Taiwan's agricultural development occurred in 1969 when the supply of rural labor for the first time began to shrink. The agricultural program of the fifth economic plan (1969-1972) called for the improvement of labor productivity, instead of land productivity, with the increase of farmers' income as its principal goal. Under the current six-year economic plan which was started in 1976, the same guideline is being followed. A drastic change has been made in the forestry policy, which stresses reforestation and forest protection to nurture the island's diminishing forest resources.

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In the late 1960's, with the structural transformation of the economy, agriculture itself underwent many changes as reflected in the reduced labor-intensiveness of farming, slowing down of the growth rate and relative decline of farm income. In a bid to redress this situation, the then Premier Chiang Ching-kuo announced in September 1972 the government decision to carry out an Accelerated Rural Development Program (ARDP). JCRR has played a key part in planning the implementation of this long-range program which is aimed at boosting farm production, readjusting the production structure, and improving farm management to speed up the process of agricultural modernization.

The shortage of farm labor and changes in agricultural structure have necessitated a recombination of the production factors and a shift from labor-intensive to capital-intensive methods of cultivation. Thus, farm credit improvement and agricultural mechanization have been emphasized in ARDP. In point of fact, JCRR began to pay attention to farm mechanization as early as 1954 and has since been actively promoting it by providing financial and technical assistance for the introduction, improvement, demonstration and extension of various types of farm machines.

As the efficiency of farm machines depends to a great extent upon the scale of farming, ARDP has also underscored the extension of joint farming operations and setting up of specialized farming areas for expanding the operating scale of small farmers, thereby enabling them to enjoy the benefits of large farms.

With the increasing commercialization of agricultural production, farmers are now more profit-conscious than ever before. Because a sound marketing system has much to do with the profitability of any farm product, the improvement of agricultural marketing to eliminate the exploitation of middlemen is another measure that has been included in ARDP.

Proper utilization of the limited agricultural resources will be a key objective of future agricultural development. With this in view, JCRR has been pushing a regional agricultural planning program under ARDP, which, by taking an inventory of the existing agricultural resources, seeks to optimize regional resource use.

About NT$2 billion in grants has been appropriated annually by the government for ARDP, of which a considerable amount has been spent on the construction of basic public facilities such as seadikes, rural roads and irrigation systems to raise the efficiency and strengthen the base of agricultural production. The benefits that have accrued from these investments in the past four years have visibly contributed to improvements in the rural economy.

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Agricultural development is a dynamic process in which there will always be new situations to deal with and new problems to tackle. JCRR is prepared to take up any challenge that may crop up in its continuing effort to extend the frontiers of Taiwan's agriculture in accordance with the national agricultural policy and in line with its own basic operating principles and program objectives.

農業計畫與產銷政策

農業計畫

中央政府於民國三十八年遷臺後，撤銷農林部，農復會即負起協助經濟部推動農業增產與農村發展的任務；除擔任政府農業諮詢機構外，並實際參與我國經濟建設農業部門各項計畫的研訂與執行。

我國第一期經建計畫農業部門係由當時行政院經濟安定委員會第四組負責研訂，農復會委員沈宗瀚博士兼任召集人，執行秘書等工作人員亦由農復會職員擔任。四十七年夏行政院改組，取消經安會，第四組併入經濟部部改爲農業計畫聯繫小組。其後政府經濟策劃單位的組織迭有變化，但農復會始終負責協調聯絡及綜合彙編農業部門計畫的工作。

各期農業部門計畫，首先由各農業機關提供基本資料及各項實施細節，經農復會配合經建會所訂經濟計畫總體目標、各階段農業發展政策目標及國內外農產品供需情形綜合彙編，再與經濟部、臺灣省政府等會商修訂後送行政院經濟建設委員會彙辦，並送行政院核准後執行。

自三十八年起，農復會運用美援成立貸款及補助計畫，爲臺灣農業發展早期經費的主要來源。五十四年美國對華經援停止後，農復會支助臺灣農業發展的經費由「中美基金」逐年撥付。五十九年及六十一年，先後又受行政院國科會及經濟部的委託，代管國科會研究補助計畫及中央補助農業發展計畫。歷年來動支的經費，至六十七年度止共達新臺幣二百六十九億二千餘萬元。臺灣省農業發展可概分爲三個階段：第一個階段自三十八年至四十一年，主要工作爲恢復農業生產力及推行土地改革；第二個階段自四十二年至五十七年，以增加農業生產爲重點；第三個階段自五十八年以迄目前，全力謀求提高農民所得。農復會針對各個發展階段的政策目標，充份運用其本身及受託代管的經費配合推行。

農產品產銷政策

在臺灣光復後的經濟重建時期，農產外銷爲我國推動經濟發展所需外滙的重要來源。農復會積極推動傳統大宗農產品的生產技術革新，以增加稻米、砂糖、茶葉、鳳梨罐頭及香茅油等的外銷能力。四十六年促請政府整頓鳳梨罐頭外銷，實施原料聯購制度；同時協助自國外引進洋菇、蘆筍及洋葱等品種，爲新興外銷作物的發展奠定了基礎。

自四十七年至五十六年，主要工作爲協調改進香蕉產銷制度及運輸調配，使香蕉成爲此一期間最主要的外銷農產品。五十二年並推動建立外銷洋菇罐頭的計畫產銷制度。

爲進一步促進農產品外銷多角化，建立農產品外銷的長期發展基礎，先後於六十一年及六十二年促請政府實施外銷蘆筍及鳳梨計畫產銷。對於新興外銷青果，促成農民團體採用統一供應制度，以加强輸銷秩序。六十五年協助政府推動多項有關洋菇、蘆筍及鳳梨產、製、銷的綜合改進措施，同時促成農民參與工方分享外銷利益的基金制度，使外銷農產事業中的農工合作關係更爲密切。

在一般農產品的進口管理方面，農復會多年來亦直接或間接參與有關關稅、輸入管制及檢疫、檢驗的聯繫協調工作。關稅稅則稅率自六十年起平均每年舉行一次全面性的檢討，其中農產品的品目均根據農復會的建議而修訂。

Agricultural Planning and Support for Trade Development

AGRICULTURAL PLANNING

Since 1949 after the Central Government moved to Taiwan, JCRR has been assisting in the planning and implementation of national agricultural development programs.

The first Four-Year Economic Development Plan, which was put into operation in 1953, was mapped out by the Economic Stabilization Board (ESB) of the Executive Yuan. Committee D, a unit under ESB, was responsible for planning and coordinating the agricultural programs of the plan, with Dr. T. H. Shen, then a commissioner of JCRR, serving as its convener and a JCRR senior specialist as its executive secretary. Following the abolishment of ESB in a cabinet reshuffle in 1958, Committee D was incorporated into the Ministry of Economic Affairs and renamed the Agricultural Planning and Coordination Committee. Despite this and subsequent changes in the organization of the national economic planning agency, JCRR has continued to function as a planner and coordinator for the agricultural sector.

In the process of agricultural planning, JCRR first drafts preliminary programs in accordance with the guidelines set by the Council for Economic Planning and Development (CEPD), and on the basis of the basic data provided by related agricultural agencies. The draft programs, after being revised through meetings with the Ministry of Economic Affairs and the Taiwan Provincial Government, are submitted to CEPD and finally to the Executive Yuan for approval and announcement.

The U.S. economic aid channeled through JCRR was the main source of funding for agricultural programs in the initial years. After this aid was phased out in 1965, JCRR has been supporting agricultural development in Taiwan with funds appropriated from the Sino-American Fund for Economic and Social Development (SAFED). In recent years, JCRR has also been entrusted by the National Science Council and the Ministry of Economic Affairs to plan and administer the use of special grant funds made available by the Council and the Central Government for agricultural research and rural development, respectively. Up to the end of June 1978, the funds from the various sources handled by JCRR had amounted to NT$26,920 million in all.

農復會每年定期與台灣省政府舉行農業計畫聯繫會議。圖示謝前主席東閔先生致詞情形。

Mr. Hsieh Tung-ming, formerly Governor of Taiwan and now Vice President of the Republic of China, is shown addressing a joint JCRR-TPG conference held to discuss agricultural programs.

SUPPORT OF GOVERNMENT AGRICULTURAL TRADE POLICY

In the early years, agricultural exports provided the main source of foreign exchange needed in Taiwan's economic development. Efforts were made by JCRR during the decade beginning in 1948 to increase, through yield and quality improvement, the export potential of rice, cane sugar, tea, canned pineapples and citronella oil. New export-oriented crops such as mushroom, asparagus and onion were also introduced from abroad during this period. In 1957, at JCRR suggestion, the government took steps to improve the operations of pineapple canneries and instituted a joint raw material purchase system for them. These endeavors laid the basis for planned production and marketing of export crops in Taiwan.

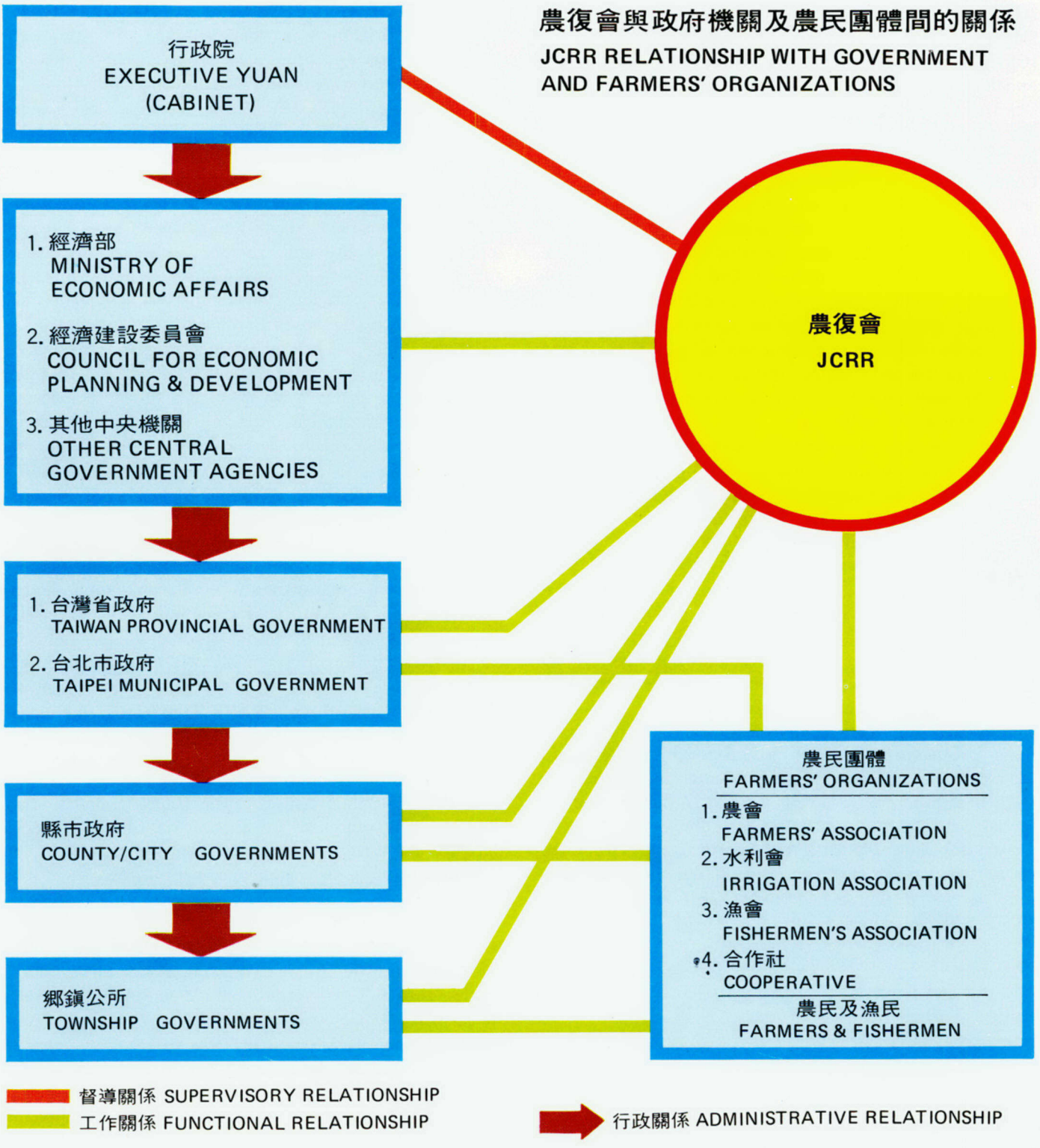
From 1958 to 1967, JCRR paid attention to the coordination of efforts for improving the production, marketing and shipping of bananas, which became the most important export item of farm origin in the period. A system for planned production and marketing of canned mushrooms was put into effect in 1963.

To further diversify agricultural exports, measures for planned production and marketing of canned asparagus and pineapples were taken by the government in 1972 and 1973, respectively, on the recommendation of JCRR. In order to regulate the marketing of newly developed fruits, JCRR also made strenuous efforts to push a system for joint delivery of export fruits by fruit marketing organizations.

In 1976, JCRR assisted the Ministry of Economic Affairs in promoting a comprehensive "Export Canned Food Industry Improvement Program", which consists of a series of improvement measures covering raw-material production, marketing, processing, factory scale adjustment, sales promotion, and establishment of stabilization funds. The implementation of the stabilization fund system, which enables farmers to share in the export profits at pre-arranged ratios, has markedly improved the relationship between them and canneries. This is helpful to the long-range development of the canned food industry.

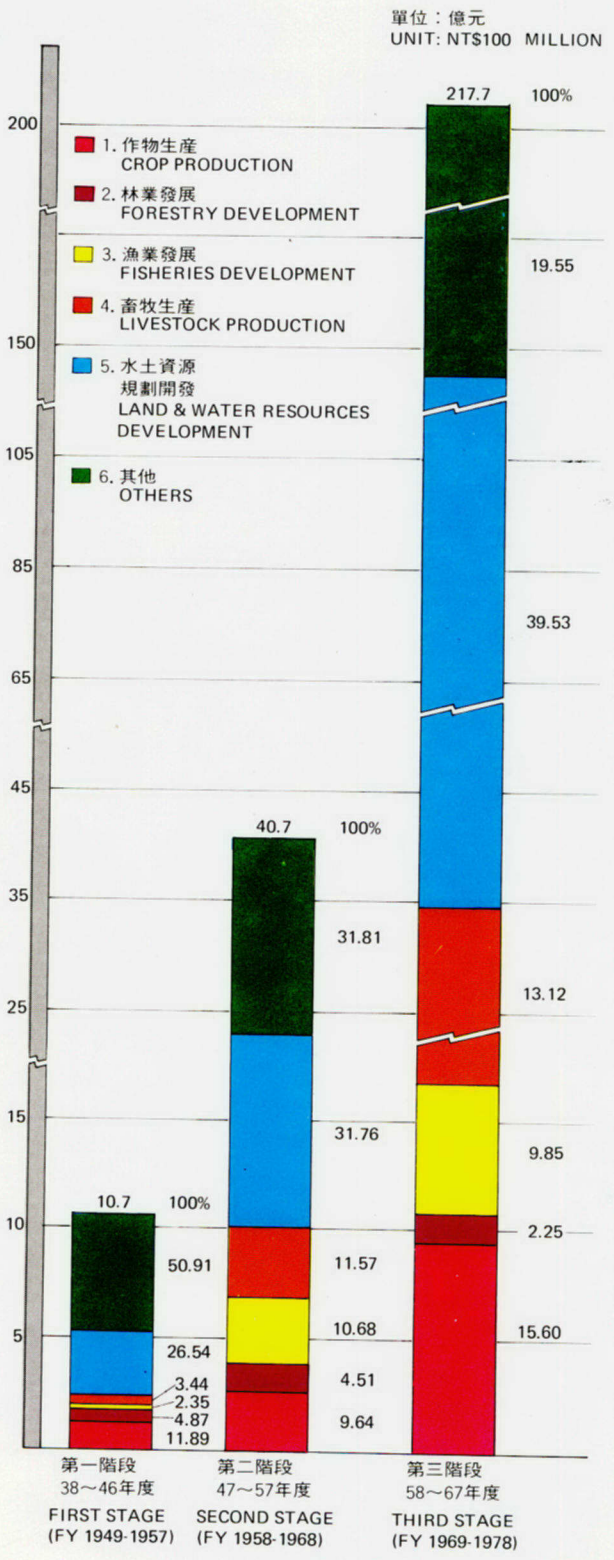
In regard to the management of agricultural imports, JCRR has also been playing a coordinating role and has involved itself either directly or indirectly in matters relating to import control, customs tariffs, inspection and quarantine, etc. Since 1971, in the annual reviews of customs tariffs by the competent government agencies, revisions of the duty rates on agricultural commodities have all been made on the basis of JCRR suggestions. Through this import-monitoring system, it has been possible to satisfy the domestic demand for farm products which are not available locally.

農復會與政府機關及農民團體間的關係
JCRR RELATIONSHIP WITH GOVERNMENT AND FARMERS' ORGANIZATIONS



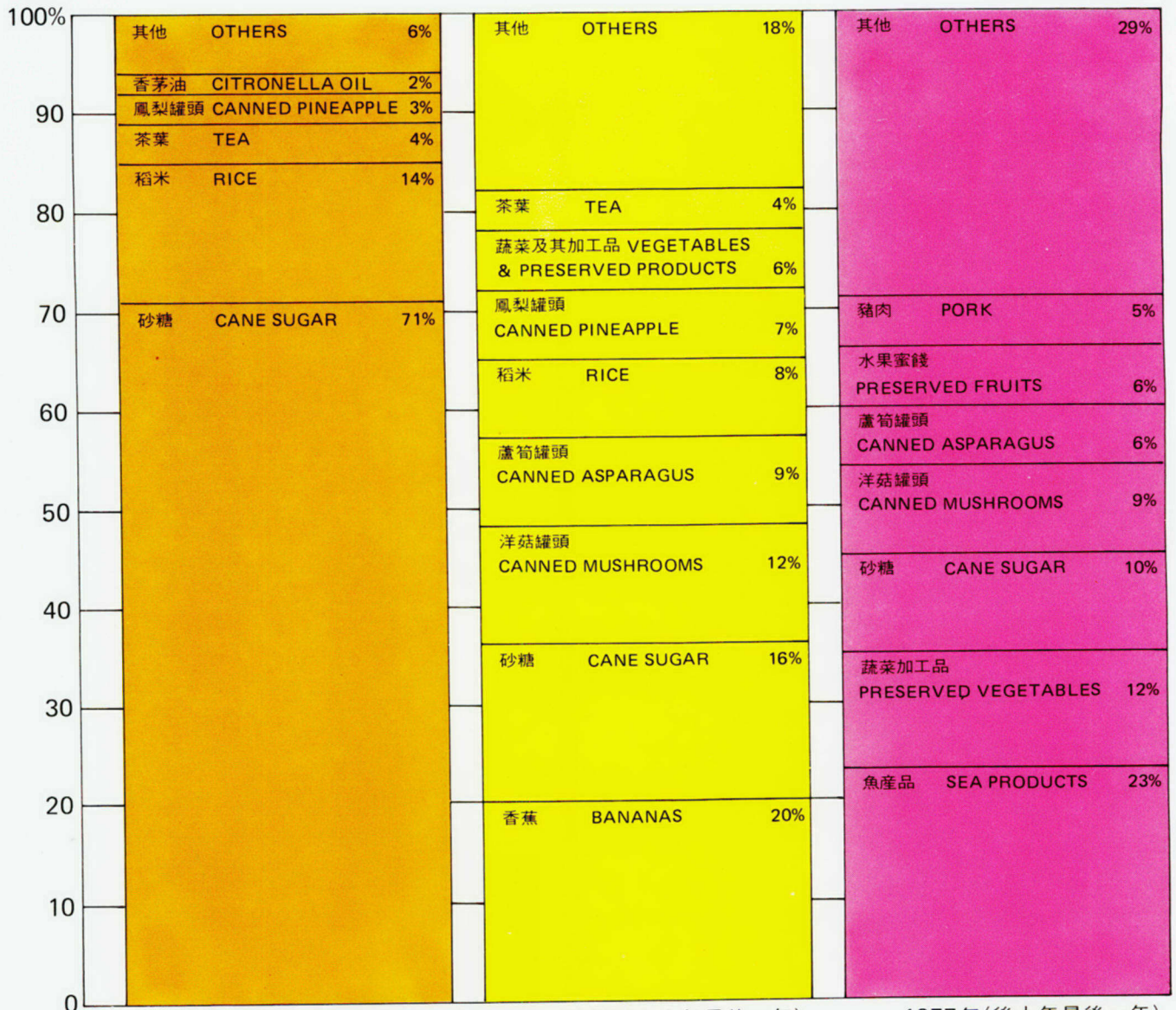
三十年來農復會經費運用概況

ALLOCATION OF AGRICULTURAL DEVELOPMENT FUNDS HANDLED BY JCRR



農產品外銷結構之改變

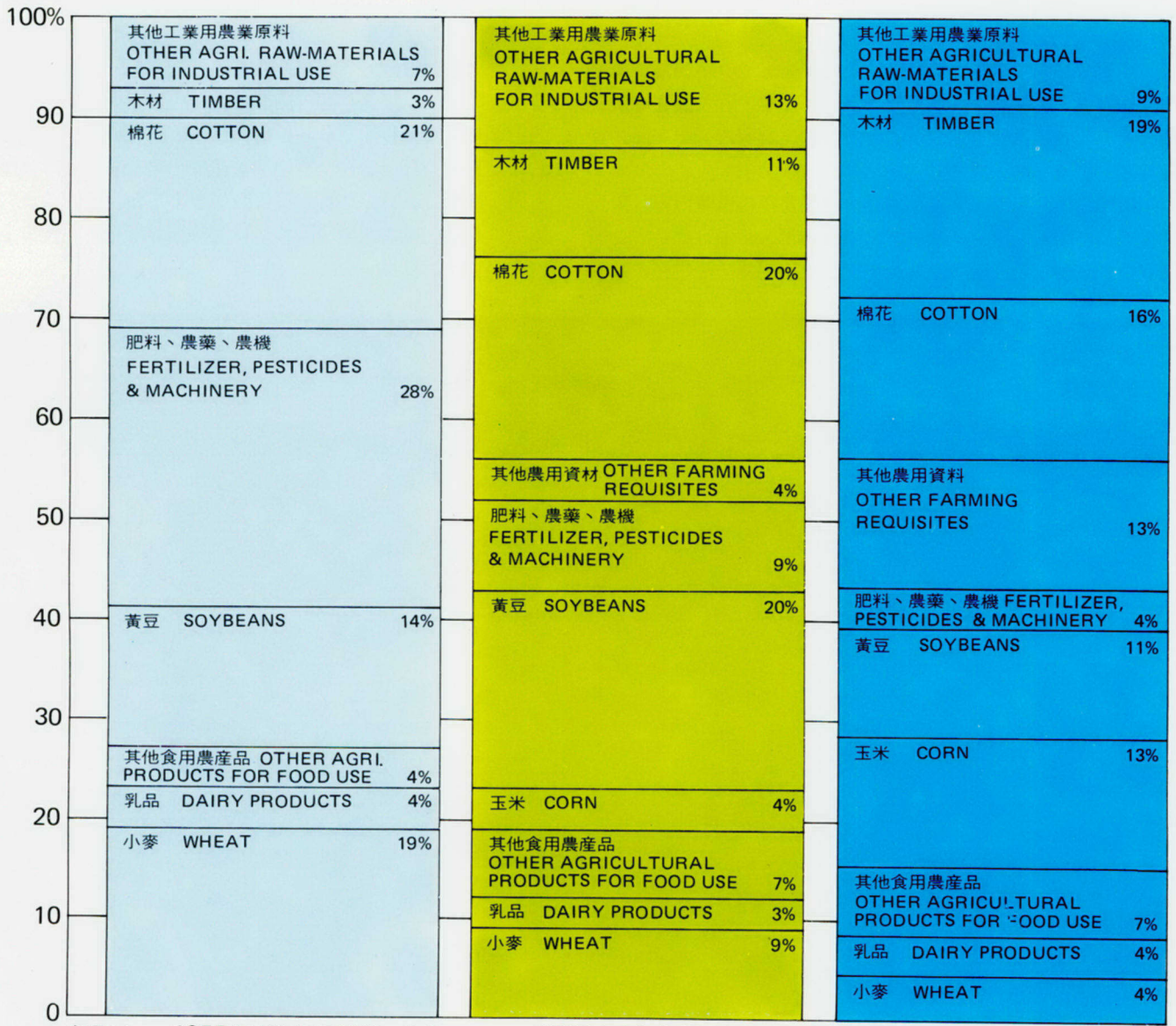
STRUCTURAL CHANGE OF TAIWAN'S AGRICULTURAL EXPORT TRADE



年別： YEAR:	1957年(前十年最後一年) (LAST YEAR OF THE FIRST DECADE)	1967年(中十年最後一年) (LAST YEAR OF THE SECOND DECADE)	1977年(後十年最後一年) (LAST YEAR OF THE THIRD DECADE)
外銷金額： EXPORT VALUE (US$ MILLION)	1.55 億美元 155	2.60 億美元 260	12.12 億美元 1,212

農產品進口結構之改變

STRUCTURAL CHANGE OF TAIWAN'S AGRICULTURAL IMPORT TRADE



年別：YEAR:	1957年（前十年最後一年）(LAST YEAR OF THE FIRST DECADE)	1967年（中十年最後一年）(LAST YEAR OF THE SECOND DECADE)	1977年（後十年最後一年）(LAST YEAR OF THE THIRD DECADE)
進口金額：IMPORT VALUE: (US$ MILLION)	0.93億美元 93	2.19億美元 219	17.67億美元 1,767

土地改革

抗戰勝利後，我國農村凋敝，生產衰竭，先總統　蔣公接受農復會的建議，選定少數地區試行　國父遺教中耕者有其田的理想，消除地權集中、租佃制度不良的弊害。故副總統陳辭修先生當時主持臺灣省政，首先採行；在農復會提供技術與經費支援下，終於完成中國歷史上最成功的農地改革。

農復會在成立之初，即將協助政府實施土地改革列爲首要工作。民國三十七年蔣夢麟博士受命主持農復會，曾晉謁先總統　蔣公，說明我國實施土地改革的需要，並建議選擇若干省縣爲實驗地區。總統　蔣公立予同意。

民國三十八年三月至同年九月，農復會獲得當時西南行政長官公署長官張羣將軍、臺灣省主席陳誠將軍、華中行政長官公署長官白崇禧將軍及廣西省主席黃旭初先生的支持，先後在福建省第七行政區、臺灣省、四川省、廣西省、貴州省及廣東省協助地方政府展開土地改革工作。臺灣省在規劃方面最爲周詳，立法最爲完備，執行最爲澈底，成果亦最爲突出。

臺灣的土地改革，歷經「三七五減租」、「公地放領」及「耕者有其田」三個階段。故副總統陳辭修先生在臺灣省主席與行政院長任內，以堅毅的魄力負起推動全責，貢獻最鉅。民國三十八年三月，農復會主任委員蔣夢麟、委員穆懿爾（美籍）、委員沈宗瀚與臺灣省政府商定三七五減租推動方案，是爲臺灣省土地改革的開端。以後五年間，農復會先後通過三十七項計畫，對於三七五減租實施後建立分區監督制度、改組各級租佃委員會、推動公地放領業務、辦理全省地籍總歸戶、草擬「耕者有其田條例」與「臺灣省發行土地實物債券條例」、建造全省地籍資料貯存庫房以及檢查與複核農戶購買公私有耕地等工作，在技術上與經費上全力予以支援。

陳故副總統辭修在台灣省主席任內向土地改革工作人員訓話。

The late Vice President Chen Cheng (center) addressing a group of government employees when he was Governor of Taiwan, reaffirming his support for the land-to-the-tiller program.

Land Reform

General poverty and declining agricultural productivity marked the rural conditions in China after World War II. In early 1949, the late President Chiang Kai-shek approved a JCRR proposal to carry out, in some selected areas, pilot land reform projects for realizing the "land-to-the-tiller" ideal advocated by Dr. Sun Yat-sen as a means of removing one of the root causes of all rural problems – concentration of landownership in the hands of a few. In Taiwan, Governor Chen Cheng, who was later to become Premier and Vice President of the republic, took up the task with zeal and vigor. Under his direction and with JCRR technical and financial assistance, the most successful rural land reform in the history of China was completed.

Land reform in Taiwan was implemented in three phases—farm rent reduction, sale of public lands, and the land-to-the-tiller program. In March 1949, JCRR chairman Chiang Monlin and commissioners Raymond T. Moyer and Shen Tsung-han came to Taiwan and worked out with the Taiwan Provincial Government a scheme for farm rent limitation, which set the sweeping land reform going. In the ensuing five years, JCRR approved a total of 37 projects to support such activities as the setting up of a system for regional supervision of the rent reduction program, reorganization of the farm tenancy committees, sale of public lands, classification of landownerships, drafting of the "Land-To-The-Tiller Act" and the "Regulations Governing the Issuance of Land Bonds Redeemable in Kind, Taiwan Province," construction of storehouses for cadastral maps and records, and inspection and rechecking of public and private-tenanted lands purchased by the farmers.

Based on the principle of social justice and aimed at the equalization of land rights, Taiwan's land reform began in 1949 with farm rent reduction. The program provided mainly for limiting the rent to 37.5% of the total annual standard yield of the main crop, and extending the lease tenure to a minimum of six years, renewable at the request of the tenant. All existing lease contracts must be revised in accordance with the new provisions and registered with the government so as to give full protection to the rights of the tenants and assure them of a more reasonable income, thereby encouraging them to increase production. The farm rent reduction program benefited a total of 300,000 tenant families or 45% of all the farm families in the province.

In 1951, the government proceeded to sell public lands to the incumbent cultivators as an example to show how the land-to-the-tiller program which was to follow should work. The price of public lands offered for sale was fixed at 2.5 times the value of the annual main crop yield, payable in kind

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1. 農復會故主任委員蔣夢麟博士（左起第三人）訪問土地改革受益農戶。

   The late Dr. Chiang Monlin (third from left), former JCRR Chairman, visiting a tenant family which had benefited from land reform.

2. 一位佃農在新租約上蓋章。

   With his family looking on, a tenant farmer putting his chop on a new lease contract.

臺灣的土地改革係基於「公平分配」的原則，以和平漸進的方式逐步實施。民國三十八年所推行的三七五減租，規定每等則耕地的地租不得超過主作物正產品年總產量三七・五%，租期至少六年，所有耕地租約必須依照這項規定重新訂定並向政府登記，目的在於改善租佃條件，保障佃農的收益，從而激發承耕者的增產意願，培養自己購買耕地的能力。在這一年中因減租而受益的佃農多達三十萬戶，佔全省總農戶數的四五%。

民國四十年開始辦理公地放領，作爲政府倡導耕者有其田的示範。承領耕地的農民可在十年內分二十期向政府攤還地價，每年攤還額爲耕地主作物正產品全年總產量的二五%，十年期滿後取得耕地所有權。至五十年止，放領的公地達九萬六千甲，承領農民計一五六、〇〇〇戶。

民國四十二年，臺灣的土地改革工作進入耕者有其田階段，政府向地主征購超額的出租耕地，由現耕佃農承購。農民與地主各有其合理的負擔與補償。前者每年應繳的地價本息及賦稅與佃農應繳的三七五佃租相近，十年內地價繳清後即可享有購得土地的全部收入；後者除可保留相當於中等水田三甲或旱田六甲的耕地以供自耕外，凡由政府征收的耕地都可獲得相當於主作物正產品年收穫量兩倍半的地價補償，以實物土地債券七成及公營事業股票三成分期混合償付。四十二年一年之中，政府共征購私有耕地一三九、〇〇〇公頃，受益佃農達一九四、八二三戶。在實施三七五減租之前，臺灣農業總人口中自耕農佔三二%、半自耕農佔二七%、佃農佔四一%。四十二年耕者有其田方案完成後，自耕農、半自耕農與佃農的比例分別爲五五%、二四%、二一%。由於政府繼續放領公地，佃農比例於民國六十六年再降至八・四五%。由臺灣土地改革直接產生的結果，可見我國的土地改革工作，儘可循公正、和平漸進的途徑來達成，與共匪在中國大陸進行「土改」所採「清算鬪爭」、「掃地出門」等手段相較，其優劣是非，至爲明顯。

近二十年來，臺灣農民在衣、食、住、行方面的顯著改善，農家購置電化製品的普遍，農村青少年就學率的迅速提高，以及自耕農對於地方政治活動的踴躍參與，間接也是受到土地改革成功的影響，與中國大陸農村的窮困蕭條與騷亂，恰成爲强烈的對比。臺灣土地改革的成功，可視爲我政府對共匪政治作戰的一大勝利；而中國大陸「土改」的失敗，則必爲匪僞政權日後覆亡的最大原因。

一位承購耕地的女性農民在繳清地價後領取土地所有權狀。
A woman farmer receiving her landownership certificate after paying up the purchase price of the land.

在耕者有其田方案下，政府征購地主超額租佃地轉售現耕農民，以實物土地債券及公營事業股票作爲補償。
Under the land-to-the-tiller program, landlords were required by law to sell their excess tenanted lands through the government, and they were paid the sale price partly in land bonds redeemable in kind and partly in stock shares of public enterprises.

in 20 semi-annual installments spread over a period of 10 years, at the end of which the tenant purchasers would officially acquire their land titles. By the end of 1961, a total of 96,000 hectares of public farm lands had been sold to 156,000 tenant families.

Land reform in Taiwan entered the land-to-the-tiller stage in 1953. Under this program, the government compulsorily purchased from private landowners their excess tenanted lands for resale to the incumbent tillers, taking into account the financial capability of the tenant purchasers as well as the need for giving fair compensation to the landlords. The tenant farmer was allowed to pay the land price in 10 years, with the amount payable each year not to exceed the equivalent of the 37.5% rent ceiling enforced since 1949. When the last installment was paid up, he could enjoy fully the income derived from the land he had bought. The landlord was eligible to keep three hectares of medium-grade paddy land or twice that much dry land for his own farming; all his tenanted lands in excess of this limit were purchased by the government and resold to tenants at a price 2.5 times the value of the annual main crop yield. The landlord was paid for his land 70 percent in land bonds redeemable in kind and 30 percent in stocks of public enterprises. Within the year of 1953, a total of 139,000 hectares of private tenanted lands were purchased by the government and resold to 194,823 tenant farmers. Prior to the implementation of farm rent reduction, owner-operators, part-owners and tenants accounted for 32%, 27% and 41% of the total farm population, respectively. Upon completion of the land-to-the-tiller program, the respective percentages were 55%, 24% and 21%. Because of continued sale of public lands by the government over the years, the percentage of tenants was further reduced to 8.4% in 1977. These results clearly indicate that land reform can be successfully achieved through peaceful and gradual means without resorting to bloodshed and violence as the Chinese communist regime did in its so-called "agrarian reform."

The impact of land reform can be readily seen in the greatly improved livelihood of the rural people, the growing numbers of farm youths attending school, and the active participation in local politics by owner-operators. This is in sharp contrast to the destitution and turbulence prevailing in the rural areas of mainland China today.

過去曾爲地主的一家公營事業的股東，出席股東大會。

Former landlords attending a stockholders meeting of a public enterprise to discuss its business plans.

農業資源調查與規劃

民國五十年代以後，由於工業快速成長造成經濟結構的改變，各項產業對於資源利用的競爭日趨激烈，同時因農村勞力的大量外移，農民所得的偏低及傳統小農制度的各種限制，使臺灣農業的發展遭遇相當困難。政府爲因應此一情勢並提高農民收益，六十二年開始推動加速農村建設措施，實施以來效果卓著。農復會鑑於農業資源必須施以整體性的規劃並作有計畫的發展，方能增產糧食以應將來人口增加的需要，近年來積極辦理農業區域發展規劃工作。經會同有關機關首先以縣市爲單位進行基本資料的蒐集與調查，以明瞭各種資源的利用現況及發展潛能，然後據以分區擬訂中、長期發展計畫，合理分配資源並配合適當改進措施，輔導農民達成最有利的生產。

基本資料的蒐集及調查

耕地土壤詳測

臺灣光復後省農業試驗所及臺灣肥料公司等曾先後於民國三十四年至四十九年間舉辦全省性土壤概測，所製土壤圖的比例尺爲十萬分之一，僅能顯示主要土類分佈的概略資料。

農復會爲提供更精確的耕地土壤基本性質與分佈資料，經於五十二年至六十七年間委託國立中興大學及農業試驗所合作辦理臺灣本島沖積平原及臺地的耕地土壤詳細調查，內容包括全省土壤分類、田間土壤鑑定與分佈描繪等。共計調查耕地八二二、五〇〇公頃，繪製二萬五千分之一土壤詳圖一六二幅，最小描繪面積爲六・三公頃，各種土壤均可在圖上表示，供爲從事土地利用規劃、土壤管理與有關調查分類的參考。

水稻田航測調查

臺灣地區水稻田的面積歷年均有統計，但缺乏確實圖面分佈資料，且每年的變動狀況亦未能即時更新。爲配合糧食生產及提供農業規劃的需要，農復會於六十三年與臺灣省農林廳合作成立航測計畫，利用最新拍攝的空中照片，進行室內判釋，再參照水利、土壤等資料，調查現有水稻田分佈面積及可能開發爲水田地區的水利、土壤及土地利用等狀況，繪製二萬五千分之一航測調查圖，以建立平地區域農地資源基本資料。此項工作已於六十七年六月全部完成。

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1. 田間土壤鑑定。
   Field identification of soils.
2. 土壤理化性質分析。
   Lab testing of soil properties.

Agricultural Resources Survey and Planning

Since the early 1960's, owing to the rapid growth of industry which has brought about drastic structural changes in the economy of Taiwan, there has been increasingly keen competition for resource use between the agricultural and non-agricultural sectors. This and other problems such as the out-migration of rural labor, relative decline of farm income and low agricultural labor productivity due to the constraining effects of the traditional small farm system, have impeded the development of agriculture. To deal with this situation and, above all, to improve farmers' earnings, the government launched an Accelerated Rural Development Program in 1973, which, to date, has already achieved outstanding results.

A parallel effort that has been proceeding in recent years with active JCRR participation is the regional agricultural development planning program. Aimed at optimizing the utilization of the limited agricultural resources for achieving maximum output through improvements in the technical and other aspects of production, the program makes use of the basic data collected under various survey and planning projects to take stock of the available resources in each region (county), find out their present condition and assess their development potentials. On the basis of this information, medium and long-range regional development plans will then be formulated for implementation by the local governments concerned.

BASIC DATA COLLECTION AND INVESTIGATION

Detailed soil survey of cropland

During 1945-1960, general soil surveys were made by the Taiwan Agricultural Research Institute and the Taiwan Fertilizer Company. Soil maps at 1:100,000 scale were produced, which, lacking in detail, showed only the distribution of major soil types.

In 1963, JCRR initiated a project for a detailed soil survey to classify and map all the agricultural soils of Taiwan. Jointly sponsored by the National Chung Hsing University and the Taiwan Agricultural Research Institute and completed in 1978, the survey covered some 822,500 ha of cropland on alluvial plains and terraces. One hundred sixty-two sheets of detailed soil maps on a scale of 1:25,000 were made and 11 volumes of soil survey reports published. The maps are useful in land use planning, soil management and related work.

Aerial survey of paddy land

To obtain reliable data on the land use condition in plain areas, especially with regard to paddy land, a JCRR-supported survey project was started in 1974 by the Provincial Department of Agriculture and Forestry. By means of photogrammetric techniques and using available soil and irrigation data, maps showing the location, area and other particulars of every tract of existing and potential paddy land were drawn at 1:25,000 scale. This project was brought to completion in June 1978.

3. 空中照片野外校正。
Ground checking of designated field locations.

4. 空中照片室內判釋。
Aerial photo interpretation.

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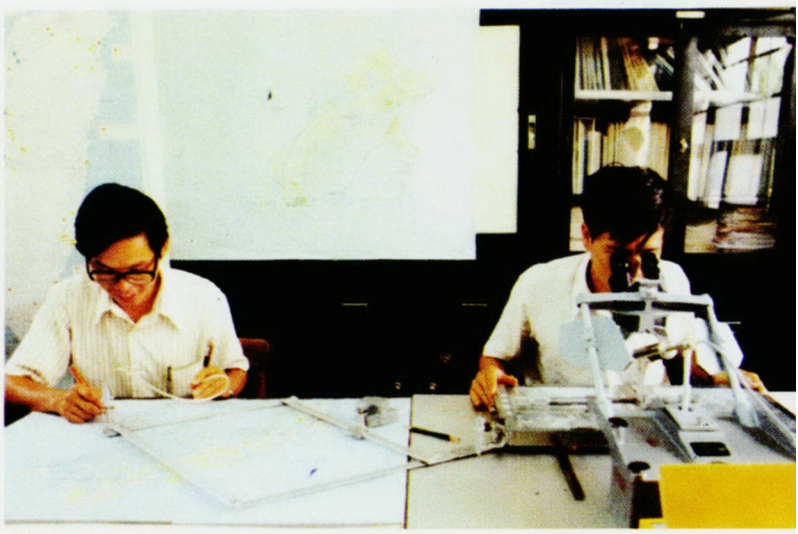
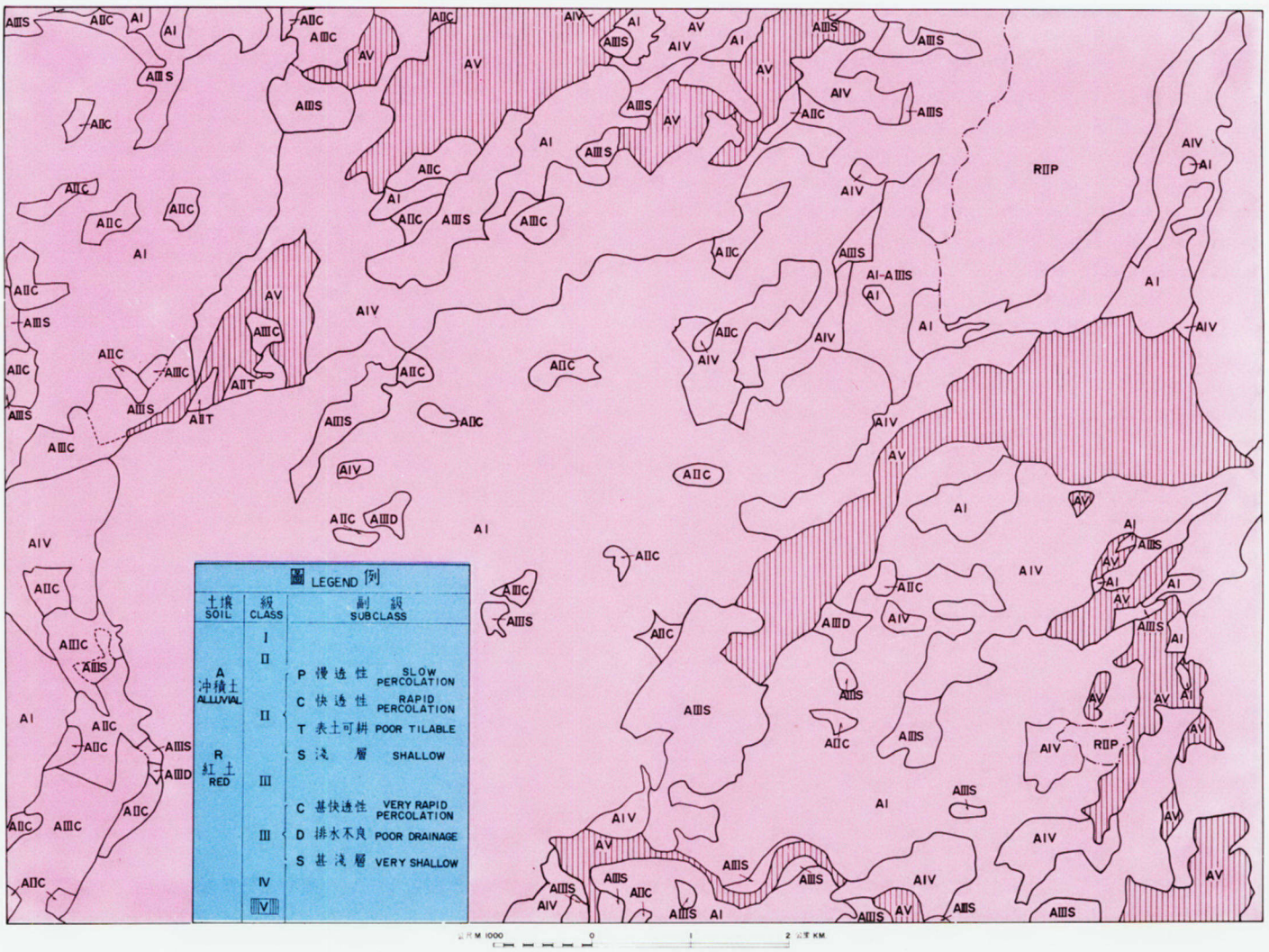


4

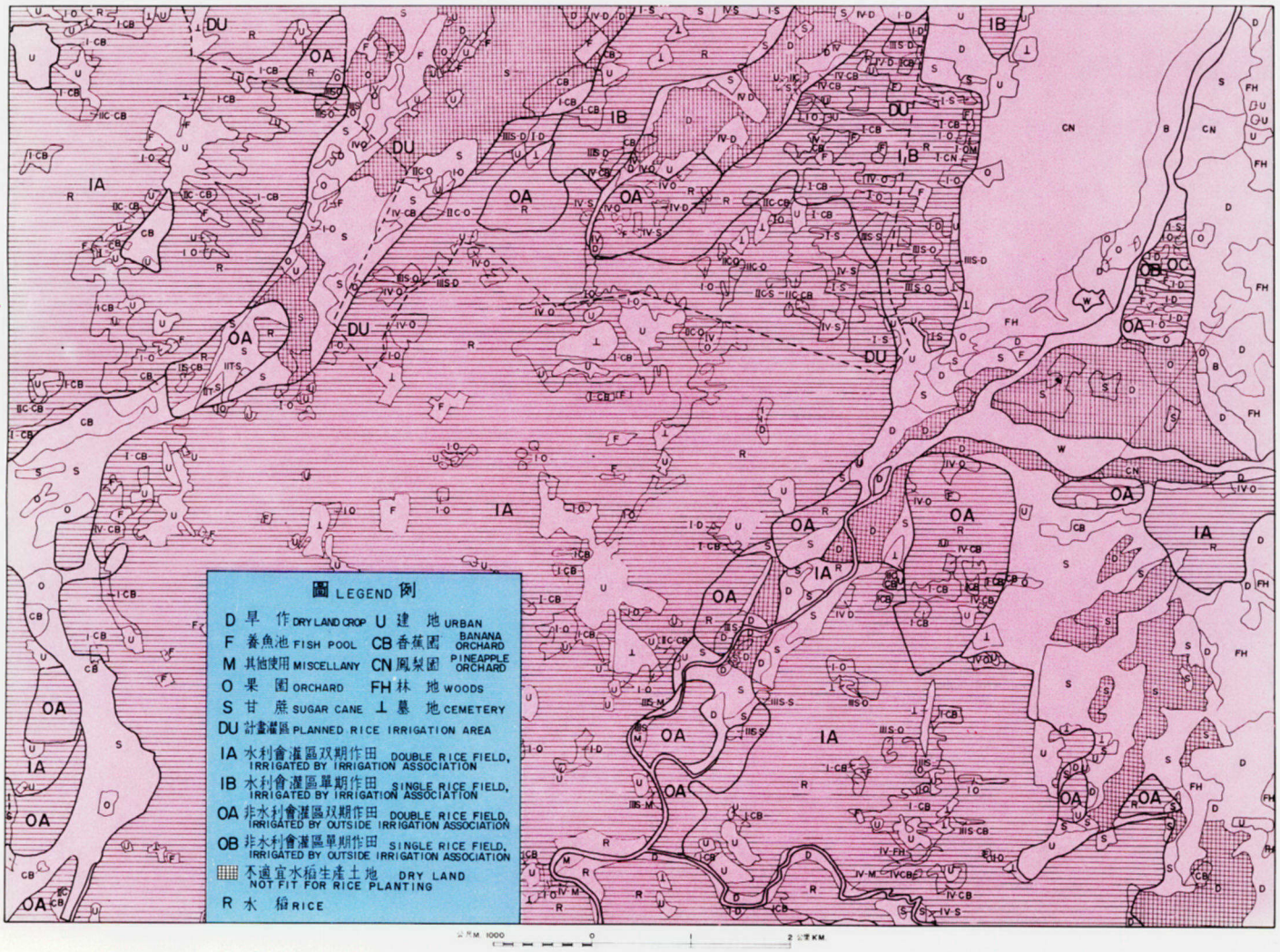
屏東內埔土壤分類圖

SOIL CLASSIFICATION MAP OF NEIPU, PINGTUNG



屏東內埔航空調查圖

AERIAL SURVEY MAP OF NEIPU, PINGTUNG

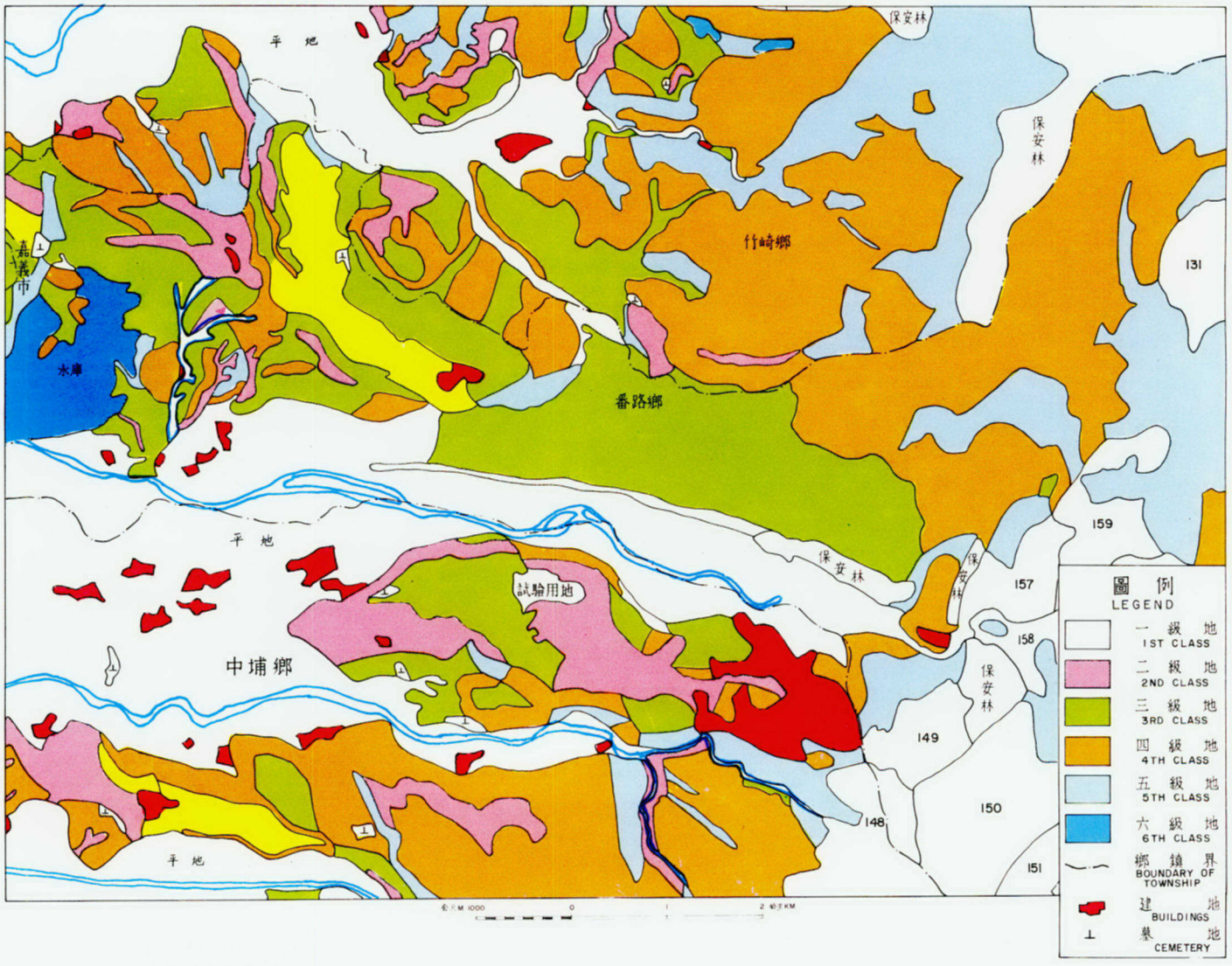


山坡地區域調查規劃

山坡地佔臺灣總面積三分之二以上。農復會爲明瞭山坡地範圍內適於發展農牧地區的分佈、利用現狀、可利用限度等級及對水土保持的需要，六十三年起提供技術及經費協助山地農牧局辦理全面性山坡地區域調查規劃。經利用航測技術，參照專家研訂的土地可利用限度分級標準，進行山坡地可利用限度的區分及土地利用現況的調查，並而研擬具有發展潛力地區的發展方向。全部工作已於六十七年六月底完成。

嘉義中埔山坡地可用限度區分圖

SLOPLAND USE CAPABILITY CLASSIFICATION MAP OF CHUNGPU, CHIAYI

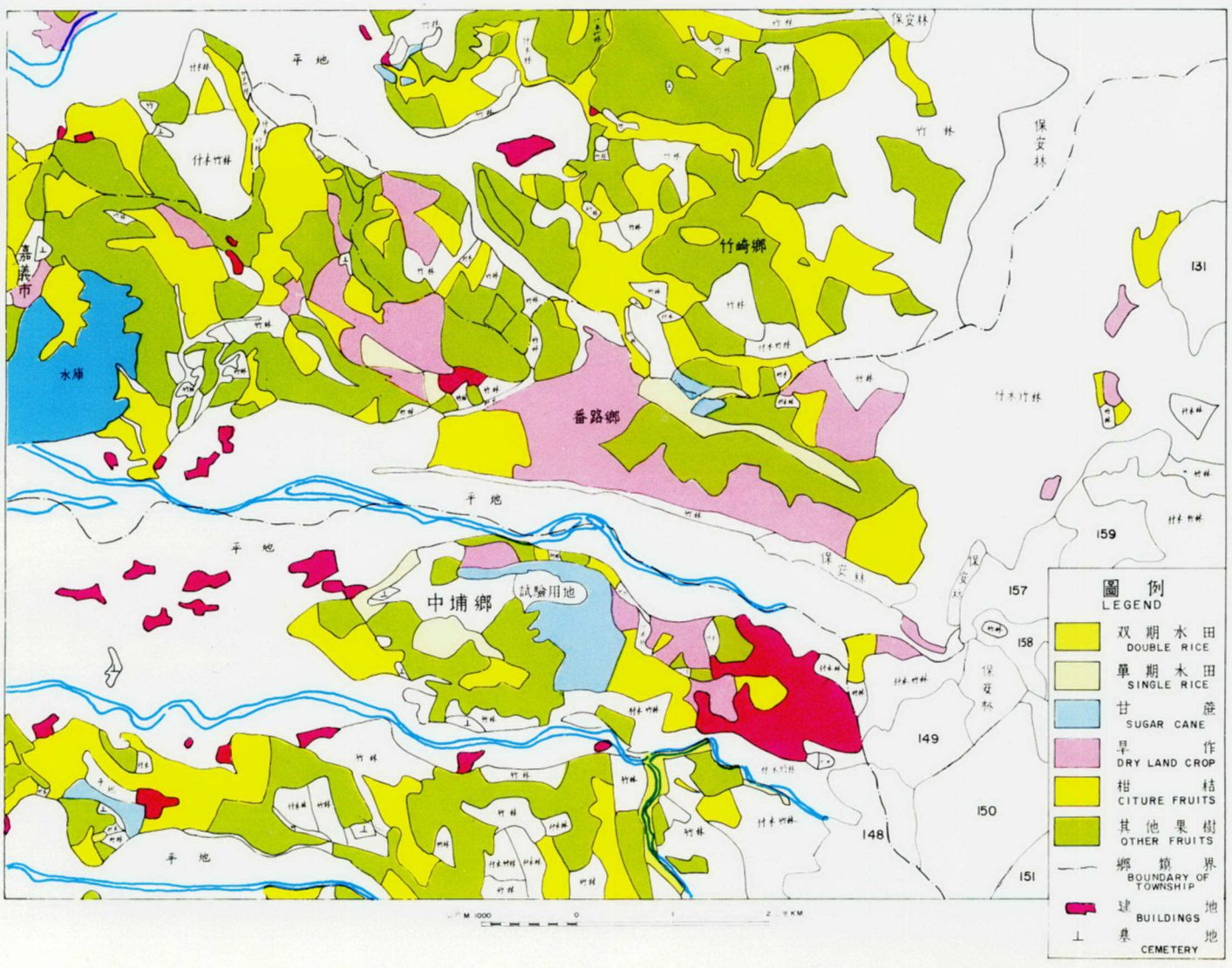


Slope land survey and planning

Slope lands account for approximately two-thirds of the total land area of Taiwan. To find out the distribution and development potentials of slope lands suitable for farming as well as their soil conservation needs so as to plan for their development on a regionwide basis, JCRR began in 1974 to assist the Mountain Agricultural Resources Development Bureau in carrying out a slope land survey and planning program. Besides delimitation of slope land areas by means of aerial photography, the activities of the program included classification of the lands according to their land-use capabilities, investigation of their present condition of use, and formulation of development plans. The program was completed by the end of June 1978.

嘉義中埔山坡地利用現況圖

PRESENT SLOPLAND USE CONDITION MAP OF CHUNGPU, CHIAYI

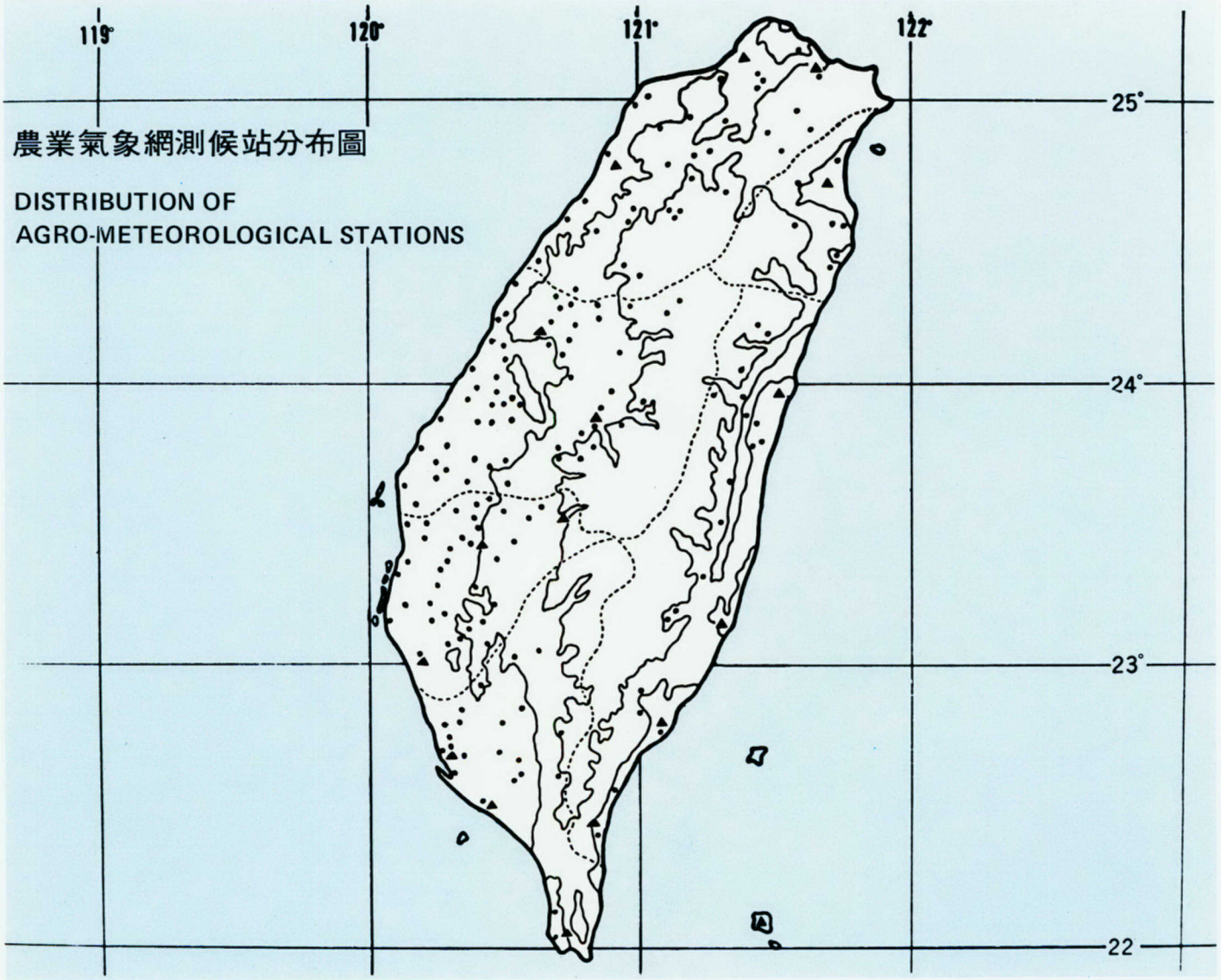


農業氣候區域研究

臺灣因緯度較低，地形複雜，常發生氣候因素引致的災害，如颱風、豪雨、乾旱及冬季寒潮等，造成農作物的重大損失。爲探討如何避免或減輕此項損失，並有效利用農業氣候資料以提高生產，農復會於六十五年五月與中央氣象局合作成立農業氣候區域研究計畫，首先在現有一千餘所民用測候站中，選出一三三所組成農業氣象觀測網，建立農業氣象研究發展的基礎；然後蒐集整理各測候站的觀測記錄資料以及有關各地區（鄉鎮）重要作物單位面積產量的資料，進行相關分析，藉以瞭解影響各地區作物產量的氣候因素，繪製作物適栽區域分佈圖；再配合適當農業氣候指數（雨量係數、溫度指數）的應用，繪製果樹適栽區域分佈圖，以顯示所選作物、果樹的適栽地區及時期，發揮適地、適期、適作的效能。此項工作已於六十七年六月完成。

耕地生產力的研究

農復會爲建立有關土地生產力的基本資料，作爲農地資源規劃的依據，六十六年起委託省農業試驗所及各區農業改良場，利用既有的初步資料，在主要農業區域選擇不同自然環境與作物栽培制度的土地，蒐集並調查其有關水、土、氣候及其他自然因子的基本資料，同時觀察當地主要作物的適應性與單位面積產量，並研討其相互關係，訂定合理的土地生產力分類標準，再進行全面性調查及繪製耕地生產力分佈圖。



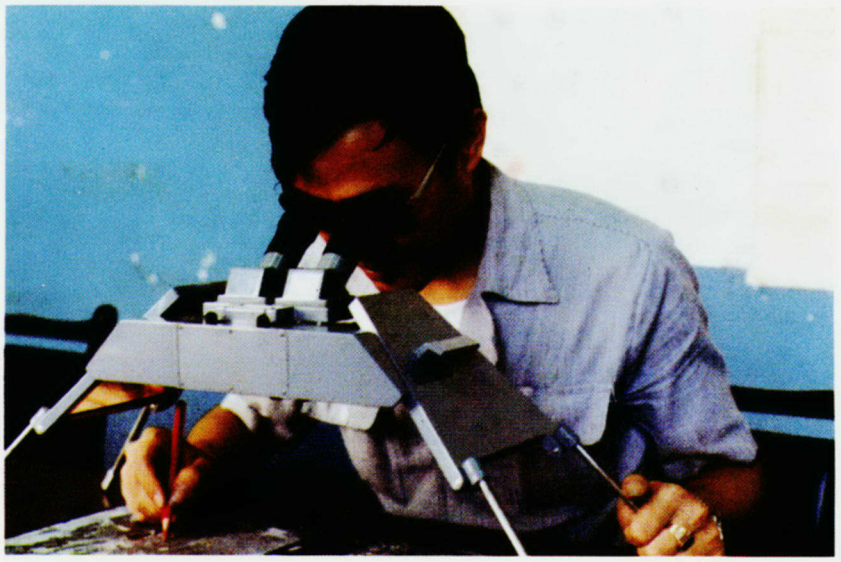
Study on agro-climate division of Taiwan

In order to understand the meteorological conditions in different regions of Taiwan as to their effects on farm production, a JCRR project for an agro-climatic study was carried out in cooperation with the Central Weather Bureau from May 1976 to June 1978. Under the project, a network of 133 agro-meteorological stations was established for collection and processing of related data. By studying the correlation between the climatic factors and local crop yields, and through the use of appropriate climatic indexes, agro-climate division maps for field crops and fruit trees were drawn.

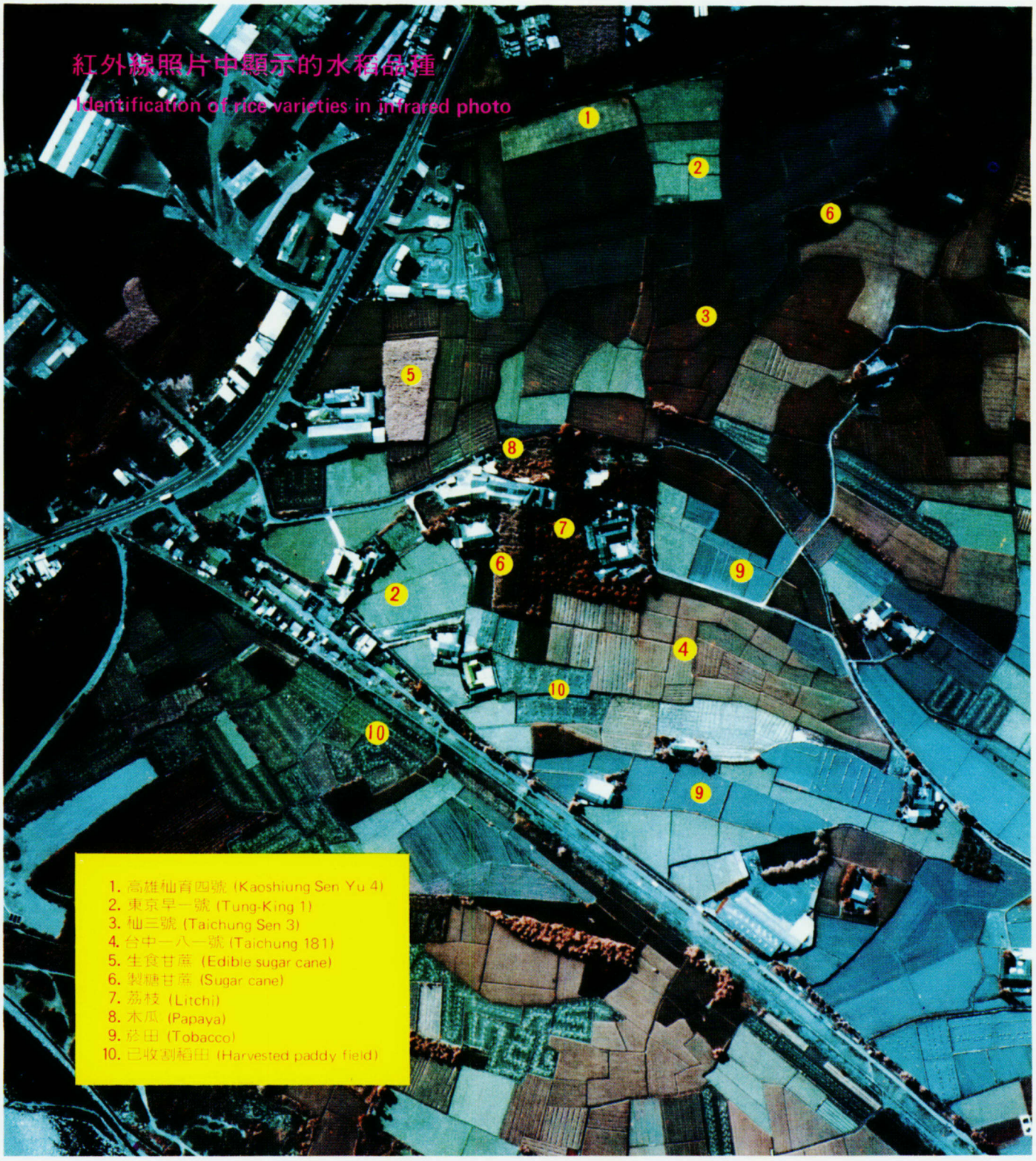
Study of farm land productivity

JCRR initiated a pilot project in 1977 for establishing a data bank on farm land productivity for development planning purposes. Executed by the Taiwan Agricultural Research Institute and the DAISs, the project provides for the collection and investigation of basic data on water, soil, climate and other natural factors in selected major agricultural areas with different cropping systems. The adaptability and unit yield of each crop and the relationship between them are also to be studied. After the criteria for land productivity classification are established, an island-wide survey will be conducted for the production of land productivity maps.

現場作物產量調查。
Field investigation of crop yield.



航測技術已廣泛應用於農工建設調查工作。
Photogrammetry is now widely used in agricultural and industrial development planning.


紅外線照片中顯示的水稻品種
Identification of rice varieties in infrared photo
1
2
6
3
5
8
7
6
9
2
4
10
10
9
1. 高雄秈育四號 (Kaoshiung Sen Yu 4)
2. 東京早一號 (Tung-King 1)
3. 秈三號 (Taichung Sen 3)
4. 台中一八一號 (Taichung 181)
5. 生食甘蔗 (Edible sugar cane)
6. 製糖甘蔗 (Sugar cane)
7. 荔枝 (Litchi)
8. 木瓜 (Papaya)
9. 菸田 (Tobacco)
10. 已收割稻田 (Harvested paddy field)


紅外線照片中顯示的樹種
Identification of tree species in infrared photo
6
3
1
4
5
2
1. 杉木 (China fir)
2. 柳杉 (Cryptomeria)
3. 泡桐 (Paulownia)
4. 孟宗竹 (Moso bamboo)
5. 桂竹 (Taiwan giant bamboo)
6. 其他闊葉樹 (Other hardwoods)

航測與遙感探測技術的引進

民國四十三年，農復會在美國農業部林務署的技術協助下，與各林業機構及臺灣大學合作，利用航空測量技術首次舉辦全省森林資源及土地利用調查。四十八年協助農林廳成立農林資源航測隊，應用航空測量技術從事農林調查工作。近二十年來先後舉辦全省森林資源調查、八七水災災情調查、全省海岸林調查、全省竹林資源調查、各主要集水區土地利用調查、東部地區闊葉樹調查及最近完成的全省第二次森林資源及土地利用調查等。

近年來遙感探測技術在資源調查上的應用已普受世界各國的重視。農復會於六十三年邀請美國科羅拉多大學教授密勒博士來臺舉辦講習；六十五年八月洽請經濟部成立遙感探測技術發展小組，負責推動遙測業務。經與各機構合作舉辦的計畫包括：利用紅外線航空照片估測稻米產量、水污染調查、衛星影像電腦處理評價、地面覆蓋物光譜研究等。

大比例尺像片基本圖的測製

鑒於各項經濟建設計畫須以詳細地圖作爲規劃的參考，而現有五萬分之一及二萬五千分之一地形圖比例尺過小，且細部資料不足，不合規劃需要，農復會自六十四年七月起與內政部、林務局、聯勤總部測量署等機關合作，推動臺灣地區大比例尺像片基本圖測製五年計畫。平地部份比例尺定爲五千分之一，山區部份一萬分之一。大比例尺基本圖的測製採用最新製圖技術，成圖快速，製成的地圖內容豐富，精度良好，可供交通、電訊、港口等建設工程及農工業初步規劃之用，亦可作爲區域規劃、都市發展及人口調查等工作的基本資料。農林生產及土地利用情形，更可藉像片圖予以詳細分類，並計算其面積以估測產量。

規劃步驟及方法

區域性農業發展規劃在臺灣尚屬創舉。六十四年五月，屏東縣首先完成水稻田航測及山坡地區劃調查，農復會即指派有關專家就該縣的農業發展進行規劃。

規劃工作中首先繪製二萬五千分之一及十萬分之一土地利用現況圖，並進行農牧用地土地分類及描繪農牧地分類圖。

其次調查蒐集各類不同土地適種作物的類別及期別、單位面積產量、生產成本、勞力需要、產值等資料，經整理後應用美國夏威夷大學的系統分析與線型規劃技術，以電腦推算最適宜的作物種類或制度。

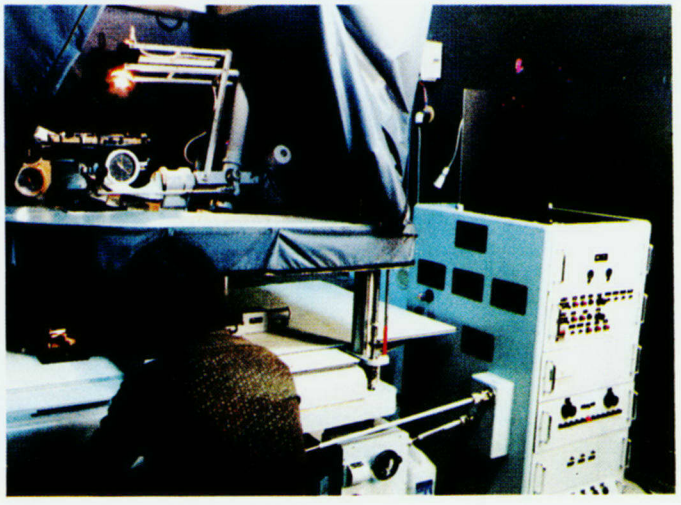
最後由專家參照電腦分析建議，根據適地適作的區域性發展原則規劃各地區農業發展型態，並描繪分區構想圖。

整個規劃工作係按照基本調查資料完成的先後次序，由南向北進行，現已初步完成，正就資源整體合理分配利用觀點予以必要的調整。由於土地資源、勞力情況以及國內外農產品的供需狀況經常發生變動，農業整體規劃應視長短期的不同目標而隨時修正調整。

初步規劃結果

以屏東縣爲例，初步規劃完成後的作物經營型態，經簡化爲十四種，如能按照規劃結果實施，可大幅增加作物種植面積、土地及勞力利用以及總賺款。其他各縣市的初步規劃結果，亦多有相當幅度的增加。

利用蔡司立體製圖儀及錄存儀作模型斷面掃描與存錄工作。
Use of Zeiss B_2 Plinimat Plotter with SG-1 Storage Unit for profile scanning and recording.



利用蔡司正射投影儀及斷面閱讀儀實施正射嚀像及等高線測製。
Use of Zeiss G2-1 Orthoprojector with LG-1 Profile Reading Unit for orthophoto production and contour line plotting.

Application of photogrammetry and remote sensing technology

In 1954, with technical support from the U.S. Forest Service, JCRR cooperated with the Taiwan Forestry Bureau and the National Taiwan University in undertaking an island-wide forest resources and land use survey, in which photogrammetry was used for the first time in Taiwan. Five years later, the Agricultural and Forestry Aerial Survey Team of PDAF was established. Over the past two decades, the team has carried out some 20 survey projects relating to disaster monitoring, resources investigation, road construction, etc.

JCRR began to make efforts as early as 1971 to introduce the remote sensing technology and develop applications for it not only in agriculture but in other fields as well. In 1974, at JCRR invitation, Prof. Lee D. Miller of Colorado State University visited Taiwan and conducted a three-month training course for 30 local technicians. A Coordination Committee for Application of Remote Sensing Technology was set up by the Ministry of Economic Affairs in August 1975 to promote the use of this new technique. So far, several pilot projects have been completed, including: (1) use of infrared photography for monitoring rice production in Changhua county, (2) feasibility study of water pollution investigation, and (3) preliminary study on the use of LANDSAT digital data for landcover classification.

Production of large-scale base maps of Taiwan

A five-year mapping project has been in progress since 1975 under the joint sponsorship of the Ministry of the Interior, the Taiwan Forestry Bureau and JCRR. The purpose is to produce orthophoto maps at 1:5,000 scale for plain areas and at 1:10,000 scale for mountain areas to replace the existing 1:25,000 and 1:50,000 topographic Maps which, made a long time ago and lacking in accuracy, cannot meet the requirements of comprehensive economic and natural resources development planning. Made with advanced mapping techniques, the base maps will supply accurate up-to-date data for use not only in agriculture but also in transportation, communication, urban planning, etc.

A total of 3,772 orthophoto maps covering all of Taiwan will be produced by June 1980.

PLANNING PROCEDURE AND METHODS

A pilot planning project was carried out by JCRR specialists in 1975 for Pingtung county in southern Taiwan, where the basic data required for the planning operation, as obtained through the various survey and planning projects, had first become available.

In the planning work, the first step is to draw land-use stuatus maps on the basis of aerial survey data on paddy lands and slope lands at scales of 1:25,000 for townships and 1:100,000 for the whole region (county). Then, the agricultural lands are classified into different categories of use and mapped accordingly.

Finally, on the basis of computer recommendations and in keeping with the principle of raising the right kind of crop or animal at the right place, the agricultural development pattern for the region is planned and township agricultural development sketch maps drawn to show how the agricultural resources in each township should be utilized.

The island-wide regional planning work, which has moved from county to county according to the progress of data collection, is now nearing completion. On the basis of the planning results, detailed development plans will be worked out for different regions, which will complement one another to form an integrated overall agricultural development plan. The regional plans are also subject to revisions in the future because of the changing land and labor supply situation and market demand.

PRELIMINARY PLANNING RESULTS

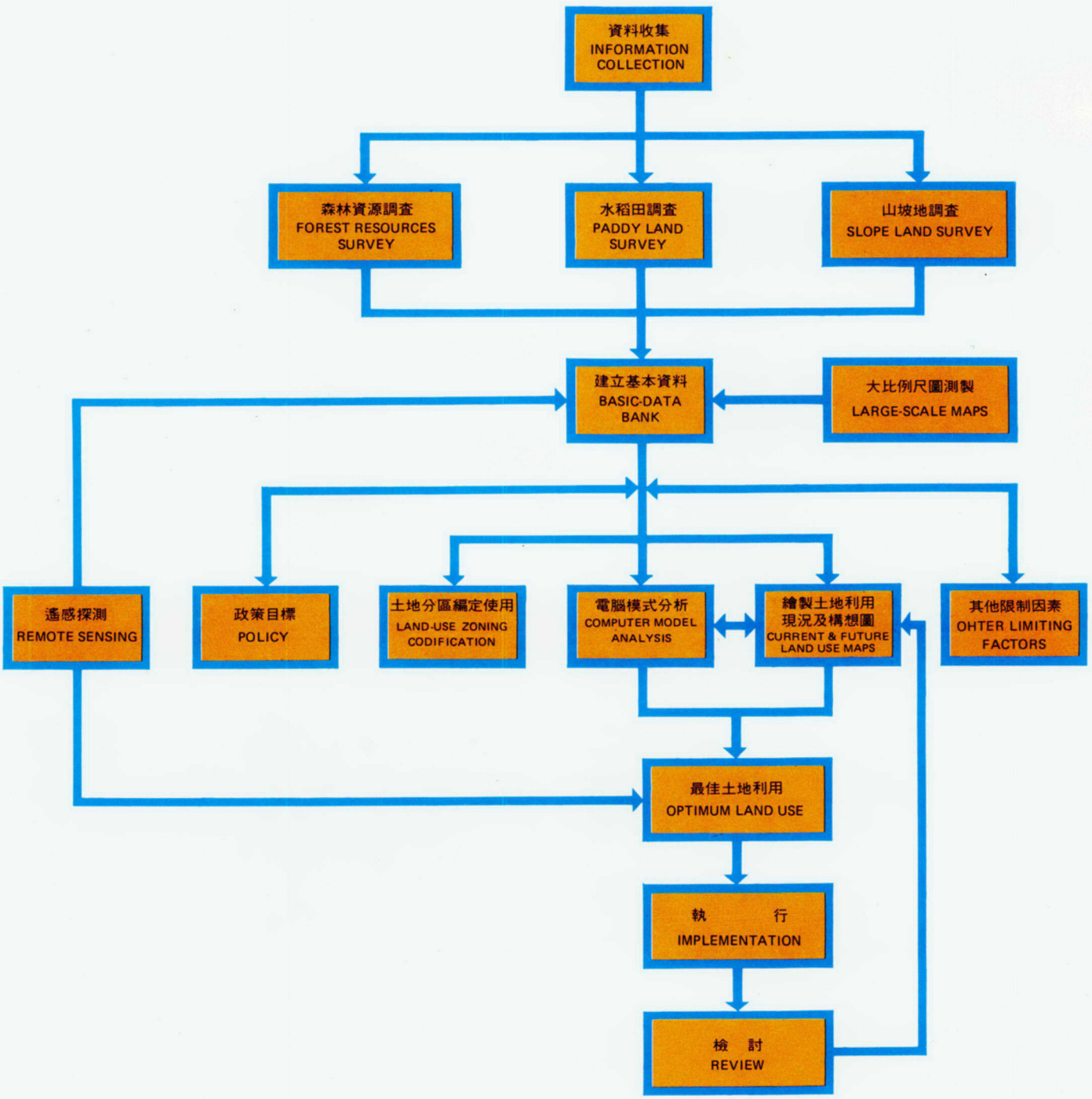
Take Pingtung county as an example. Fourteen cropping systems have been planned for the region. Implementation of the planning results will lead to marked increases in the total crop area, land and labor utilization rates and farm receipts.

農復會農業資源調查規劃小組專家商討各地區農業發展型態。

JCRR specialists gather to discuss agricultural development patterns for different regions.

農業區域發展規劃程序圖

FLOW CHART OF REGIONAL AGRICULTURAL DEVELOPMENT PLANNING



屏東縣規劃後作物制度區及面積表
Major Cropping Systems for Pingtung County

規劃發展區 Cropping system	面積 單位：公頃 Area Planned (hectare)	規劃發展區 Cropping system	面積 單位：公頃 Area Planned (hectare)
雙期水稻及裡作大豆區 Rice-soybean (catch crop)-rice	33,673	鳳梨區 Pineapple	2,500
單期水稻與裡作大豆區 Rice-soybean (catch crop)	6,537	蘆筍西瓜區 Asparagus and watermelon	3,090
雙期水稻及裡作紅豆區 Rice-adzuki bean (catch crop)-rice	5,631	蠶桑區 Sericulture	797
水稻及裡作洋蔥區 Rice-onion (catch crop)	704	瓊麻區 Sisal	3,852
甘蔗區 Sugar cane	13,839	果樹＋養豬＋雜作區 Fruit trees, hog farming & dryland crops	3,570
香蕉區 Banana	2,300	牧草區 Pasture	6,720
		合計 Total	83,213

屏東縣規劃前後作物面積及效益比較表
Crop Areas and Farm Receipts Before and After Planning in Pingtung County

單位：公頃 Unit: hectare

作物名稱 Crop	六十二年情況 Before Planning (1973)	規劃結果 After Planning	作物名稱 Crop	六十二年情況 Before Planning (1973)	規劃結果 After Planning
一期水稻 First rice crop	35,451	39,862	食用甘蔗 Edible sugar cane	300	475
二期水稻 Second rice crop	38,984	47,062	花生 Peanuts	1,088	0
裡作大豆 Soybeans (catch crop)	21,173	34,862	樹薯 Cassava	2,199	0
裡作紅豆 Adzuki beans	6,362	5,631	木瓜 Papayas	303	310
香蕉 Bananas	8,162	2,300	其他果樹 Other fruit trees	1,774	2,559
蘆筍 Asparagus	2,512	1,500	西瓜 Watermelons	1,700	3,180
鳳梨 Pineapples	1,820	2,489	蔬菜 Vegetables	7,233	7,500
甘蔗 Sugar cane	11,200	13,839	粟 Millet	866	0
洋蔥 Onions	536	704	牧草 Pasture	613	6,720
蠶桑 Mulberry	180	797	總作物面積 Total crop area	168,590	177,731
瓊麻 Sisal	7,018	3,852	耕地面積 Cultivated land area	81,650	83,493
甘藷 Sweet potatoes	12,078	3,253	複作指數 Multiple cropping index	206.47	212.89
裡作玉米 Corn (catch crop)	332	0	土地利用率（%） Land utilization rate	70.06%	91.96%
大豆 Soybeans	3,452	0	勞力利用率（%） Labor utilization rate	36.63%	42.80%
裡作花豆 Multiflora beans	2,418	0	總賸款（百萬元） Total net farm receipts (in millions of NT dollars)	4,908	5,857
菸草 Tobacco	836	836			


屏東高樹土地利用分類圖
SOIL CLASSIFICATION MAP OF KAOSHU, PINGTUNG
圖例
LEGEND
平地双期作水田
DOUBLE CROPPING PADDY FIELD OF PLAIN AREA
平地單期作水田
SINGLE CROPPING PADDY FIELD OF PLAIN AREA
平地旱田
DRYLAND OF PLAIN AREA
坡地一級旱田
1ST CLASS DRYLAND OF SLOPLAND
坡地二級旱田
2ND CLASS DRYLAND OF SLOPLAND
坡地三級旱田
3RD CLASS DRYLAND OF SLOPLAND
坡地四級旱田
4TH CLASS DRYLAND OF SLOPLAND
建地
BUILDINGS
墓地
CEMETERY
鄉鎮界
BOUNDARY OF TOWNSHIP


屏東高樹土地利用構想圖
PROPOSED LAND USE MAP OF KAOSHU, PINGTUNG
圖例
LEGEND
双期水稻＋裏作大豆
DOUBLE RICE - WINTER SOYBEAN
桑
MULBERRY
單期水稻＋裏作大豆
SINGLE RICE - WINTER SOYBEAN
建地
BUILDING
鳳梨
PINEAPPLE
墓地
CEMETERY
甘蔗
SUGAR CANE
水稻計畫灌溉區
PLANNED RICE IRRIGATION AREA
牧草（養牛）
PASTURE (CATTLE)
鄉鎮界
BOUNDARY OF TOWNSHIP

農作物生產與改良

臺灣農作物三十年來的發展歷程，依照發展特色區分，前十年爲生產復興期，中十年爲新興作物發展期，後十年爲生產現代化期。在光復初期，農業生產低落，復興農村工作以增產充裕糧食供應爲先。農復會在土地改革成功的基礎上，配合新耕種技術的引進利用及複作制度的建立，協助大幅提高了土地的生產力，農作生產迅速復甦，爲臺灣的農業發展提供了有利的先決條件。

新興作物的發展約自二十年前開始，經過十年的耕耘，改變了以稻米爲主的傳統農業生產型態，更開創了作物經營及農產外銷的新局面，農村經濟更爲繁榮。經協助引進及改良的新興作物種類繁多，主要的有洋菇、蘆筍、馬鈴薯、無子西瓜、檬果、葡萄、梨、蘋果、水蜜桃等十餘種。新興作物栽培成功，全賴不斷的科技研究改良。在同一時期，各種作物的單位面積產量，也因高產新品種的育成，栽培環境與技術及病蟲害防治的不斷改進而大幅提高。

近十年來，鑑於工商業部門的快速發展，農村勞力呈現缺乏及老化現象，加以農業所得偏低，在作物生產方面除繼續增產及尋求其他新興作物外，特別以提高農民收益及發展省工集約栽培技術爲主要工作目標；加速耕作機械化、設立農作生產專業區及推行綜合栽培技術都是重點項目。由於新科學技術的發展爲突破作物生產瓶頸的必要條件，加强農作物科技研究工作愈益重要。

稻米生產

增加稻米生產向爲政府的一項重要政策目標。光復初期，政府所採行的增產措施包括修復及擴充水利設施，增加化學肥料的輸入及有機肥料的使用，建立良種繁殖制度，引進有機磷殺蟲劑等。

農復會於民國四十三年起舉辦稻田輪流灌溉的試驗及示範，稻作面積因而擴增甚多。爲配合化學肥料的輸入，經雇用大批技術人員協助政府辦理配肥作業並在全省普遍設置水稻肥料示範田及在鄉鎮舉辦肥料講習會。至四十六年，全省肥料總消費量已由三十七年的十三萬公噸增達六十萬公噸，其中約五十萬公噸係用於稻作。在有機肥料方面，補助農民修建堆肥舍十一萬餘棟，年可生產堆肥約二百七十萬公噸。此外並引進及推廣紫雲英，目前仍爲中北部水田冬季僅有的一種綠肥作物。四十一年自香港引入二公升「巴拉松」（即富粒多）樣品，首次試用有機磷劑，經於田間試驗防治水稻螟蟲成功後，迅速爲各地農民採用，至四十六年時，已有十萬公頃以上稻田施用「巴拉松」、「PM」或「大利農」。

臺灣栽培的「蓬萊稻」係由日人選育成功的一種粳型稻種，「在來稻」則爲我國閩粵人民遷居臺灣時所帶來的秈型稻種；光復後，稻種多已混雜或退化。農復會首先協助政府設置良種繁殖田，四十五年支援臺灣大學及農林廳分別設立種子研究室及檢查室，前者供研究及訓練人才，後者負責各級種子繁殖田生產種子的室內檢查。在水稻品種改良方面，四十年開始推動「在來稻」的純化及秈稻育種工作。世界上第一個經由雜交育成的半矮性秈稻品種「臺中在來一號」於四十五年由臺中區農業改良場育成推廣，打破了秈稻較粳稻低產的觀念。其親本「低脚烏尖」的半矮性基因並供爲各國育成半矮性優良稻種的主要種源，所獲成就享譽國際。

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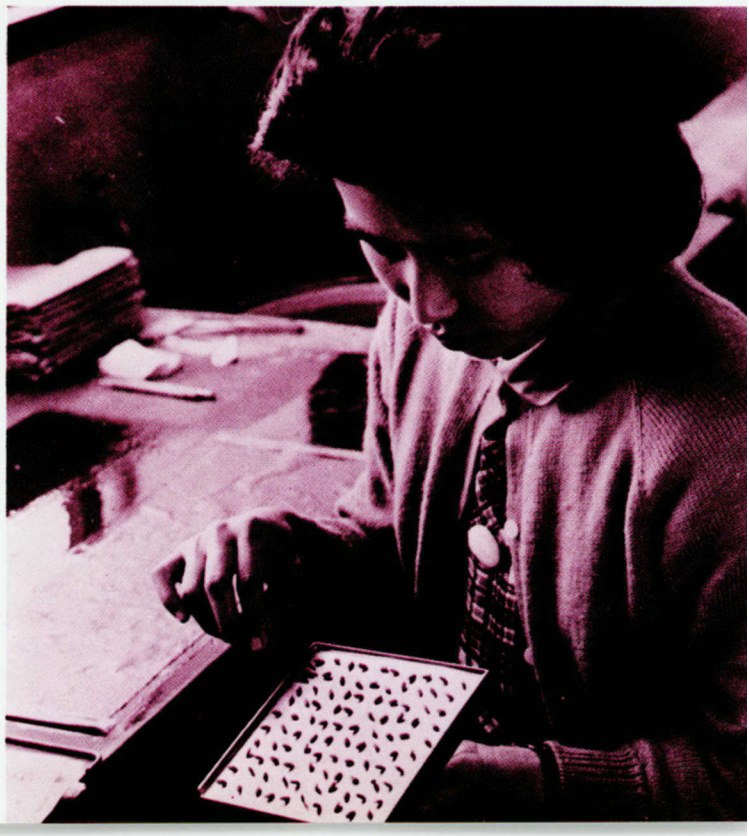

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Crop Production and Improvement

The development process of crop production in Taiwan in the past 30 years may be divided roughly into three stages featuring, respectively, restoration of production, development of new crops, and modernization of production systems.

In the immediate postwar years, agricultural production was generally low, and one of the principal objectives of rural reconstruction was to increase the output of food grains. Following the successful implementation of land reform, JCRR actively assisted in boosting the productivity of land through the introduction of new cultural techniques and establishment of multiple cropping systems, which helped accelerate the revival of crop production and provided a framework for further agricultural growth.

The development of new crops began in the late 1950's. In a 10-year span, very fruitful results were achieved as indicated by the rapid crop diversification in the production pattern which traditionally emphasized rice and sugar cane. This change contributed to the expansion of Taiwan's farm exports and brought prosperity to the rural areas. The new crops introduced or developed under JCRR-supported projects included mushrooms, asparagus, potatoes, seedless watermelons, mangoes, grapes, pears, apples, and peaches. Their commercial cultivation was made possible through an extensive agricultural research and experimentation program which had been considerably strengthened. Meantime, the per hectare yields of various other crops all showed increases as a result of the successful breeding of high yielding varieties, improvement of growth conditions and cultural practices, and control of diseases and insect pests.

In the recent decade, the phenomenal rise of industry and commerce has caused some serious problems for agriculture, e.g., a shortage of rural labor and relative decline of farm income. To cope with this situation and continue to increase production, intensive efforts have been made to develop labor-saving cultural methods, speed up farm mechanization, establish specialized crop production areas, promote integrated use of improved farming techniques, and search for more high-value crops with development potential. As technical improvement and innovation are essential for making breakthroughs in crop production, JCRR has been paying serious attention to agricultural research and technological development.

RICE

Increase of rice production has always been an important policy goal of the government. The promotive measures taken in the initial years included repair and construction of irrigation systems, import of chemical fertilizers, encouragement of application of organic manure, establishment of seed multiplication systems, and introduction of phosphorous insecticides.

In 1954, JCRR initiated experiments and demonstrations on rotational irrigation, which resulted in a significant increase in the area of paddy land. To extend the use of chemical fertilizers, JCRR hired technicians to help with the distribution operation and assisted in setting up demonstration plots and conducting training classes for farmers in every township. During 1948–1957, the total fertilizer consumption in Taiwan grew from 130,000 tons to 600,000 tons of which some 500,000 tons were used on rice.

Meanwhile, with JCRR assistance, the farmers built more than 110,000 compost huts, which were capable of producing about 2,700,000 tons of compost a year. In 1953, two liters of Parathion was imported from Hong Kong; trial use of this phosphorous insecticide for the control of stem borers proved so successful that it was soon generally adopted by the farmers. By 1957, over 100,000 ha of paddy fields had been treated with Parathion, PM, and Diazinon.

Two major groups of rice are grown in Taiwan: the *ponlai* rice and the *chailai* rice. The former is a subspecies of the *japonica* type bred during the Japanese colonial period and the latter is a subspecies of the *indica* type brought to this island by early settlers from Fukien and Kwangtung provinces. After World War II, most of the rice varieties had degenerated or become mixed. JCRR took the initiative in helping the government set up seed farms and, in 1956, assisted the Provincial Department of Agriculture and Forestry (PDAF) and the National Taiwan University in establishing seed research and testing laboratories for training seed workers and checking the quality of foundation, registered, and certified seeds. In varietal improvement, a program for selection and breeding of *indica* rice was started in 1951, and a pioneer semidwarf hybrid, Taichung Native 1, was released in 1956. The semidwarf characteristic of Taichung Native I came from its female parent Dee-chio-wu-gin which has since been used by plant breeders in other countries to develop rice varieties of this type.

1. 一座農復會補助興建的堆肥舍。
   A compost house built with JCRR assistance.

2. 種子發芽試驗。
   Seed germination test.

稻米生產及改良工作，經過近十年的努力，由恢復生產進入精耕階段。爲提高土地生產力而發展的水田複作制度更成爲東南亞各國改進作物生產的模式。他如肥料分配、病蟲害共同防治及綜合技術應用等措施，對提高單位面積產量都有相當成效。農復會爲配合上述工作，協助農林廳研訂實施水稻品種各級試驗的方法及程序，使臺南五號、新竹五十六號等優良品種得以在短期內育成推廣。爲選育抗稻熱病品種，經補助省農業試驗所嘉義試驗分所建立幼苗期抗病性檢定網室，並分在全省五個地區設置田間病圃，進行水稻雜交後代與新育成品系抗病性的檢定及稻熱病生理小種的鑑定工作。五十年至五十三年間，屏東地區普遍發生水稻病害，農復會專家研究證實係一種由黑尾浮塵子所傳播的毒素病，定名爲黃葉病，經建議在秧田及本田實施空中噴藥，終能加以控制，而空中噴藥則漸次發展成爲大面積防治水稻病害的經濟有效方法。另爲求證綜合應用各種改良技術對稻米生產的效果及探討增產的潛力，五十二年起舉辦水稻品種、施肥、病蟲害防治及灌溉排水等綜合運用示範，顯示增產可達二五～三〇%，後由農林廳及糧食局每年配合鉅額經費全面推廣，爲近十年來稻米增產的重要因素。

五十年代後期，稻作因受工資上漲的衝擊，以精耕求取增產的觀念已不易爲農民接受，同時由於米價偏低，農民種稻興趣減低。六十二年時，稻作面積減至七十二萬餘公頃，總生產量僅達二百二十餘萬公噸。政府基於維持稻米自足而有餘的需要，特訂定最低保證收購價格，並提供無息生產貸款及輔導廢耕地復耕。農復會除在政策方面配合支援外，在生產技術方面協助農林廳及糧食局全面推動水稻綜合栽培，在臺中及屏東地區設置大規模示範田，謀求第二期稻作的增產。在秈稻改良方面，協助嘉義農業試驗分所育成長粒型半矮性秈稻，具有高產、抗稻褐飛蝨與白葉枯病、低顆粒澱粉等優良特性。褐飛蝨爲目前臺灣唯一主要稻作害蟲，不易以藥劑防治，此一抗蟲品種的育成使稻作改良又邁入一新的里程。

蔣總統經國先生在担任行政院長時會同當時的謝主席東閔(左)視察台南縣白河鎮稻作實驗區。

Mr. Chiang Ching-kuo, while as Premier, visiting an experimental rice farming area in Tainan in the company of Mr. Hsieh Tung-ming (left), the then Governor of Taiwan.

前經濟部孫部長運璿(右)等一行在農復會前委員蔣彥士陪同下視察機械插秧育苗箱播種情形。

Former Economic Minister (now Premier) Sun Yun-suan (right) and his party inspecting the seeding operation connected with mechanized rice transplanting. Second from right is former JCRR Commissioner Y. S. Tsiang.

1. 台南五號施穗肥後結實情形。
   Growing condition of "Tainan No. 5" after application of fertilizer during the tillering stage.
2. 利用直昇機實施空中噴藥。
   Aerial spraying of pesticide by means of a helicopter.
3. 農復會前植物生產組組長張憲秋視察蓬萊稻生長情形（背景爲在來稻）。
   Dr. H. T. Chang, a former chief of JCRR's Plant Industry Division, inspecting the growing condition of Ponlai rice. In the background is native rice.

To raise land productivity, a labor-intensive multiple cropping system for paddy land was developed after almost 10 years of efforts. Other measures such as adequate supply of fertilizer, joint disease and pest control, and integrated use of improved techniques all contributed to the increase of the unit area grain yields. JCRR also helped PDAF systemize the experimental procedures for rice breeding at various stages, which led to the successful development of two superior varieties, Tainan 5 and Hsinchu 56, in a short period.

For the development of blast-resistant rice, JCRR helped the Chiayi station of the Taiwan Agricultural Research Institute (TARI) build a wirehouse to screen rice stocks for blast resistance at the seedling stage, and set up five blast nurseries to screen hybrid progeny for resistance as well as to identify the physiological races of the causative fungus.

In 1961-1964, transitory yellowing, a virus disease, was widely prevalent in the Pingtung area. At JCRR suggestion, aerial spraying of insecticides to control its carrier, the green rice leafhopper (*Nephotettix apicalis*), was tried out successfully. Since then, aerial spraying has been generally applied as an economical and effective means for the large-area control of rice diseases. To explore and enhance the yield potential of rice, a demonstration began in 1963 to show the benefit of combined use of superior varieties, recommended fertilizer rates, cooperative pest control, and improved irrigation/drainage practices. The results showed a 20-30% rise in grain yield. Later, with funds contributed annually by PDAF and the Provincial Food Bureau, integrated rice cultivation was extended island-wide. This has been a major factor contributing to the continued increase of rice output in the last 10 years.

In the late 1960's, owing to the mounting labor cost in rural areas, the intensive farming approach to increasing crop production began to lose its appeal to farmers. This problem was compounded by the depressed market price of rice. In 1973, the area planted to this crop decreased to 720,000 hectares, and production was down to 2,200,000 tons of brown rice.

To maintain an output above the self-sufficiency level, the government has in recent years offered guaranteed prices and interest-free loans to rice farmers as incentives to re-cultivate their abandoned cropland. In support of this policy, JCRR has assisted PDAF and the Provincial Food Brueau in conducting large-scale demonstrations on integrated rice culture in the Taichung and Pingtung areas, and in seeking to increase the unit yield of the second rice crop.

For the improvement of *indica* rice, JCRR has also supported the Chiayi station of TARI in its breeding work. Already bred is a long-grained, high-yielding semidwarf variety which is resistant to both brown planthoppers and bacterial diseases and low in amylose content. The development of this variety marks a new milestone in the history of rice improvement as the brown planthopper, a major pest of rice in Taiwan, is difficult to control by chemical means.

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1. 蔣彥士博士與雜交玉米「台南五號」。
Dr. Y. S. Tsiang and the hybrid corn "Tainan No. 5."

2. 高粱改良品種「威士」推廣情形。
Extension of the sorghum variety "Westland."

3. 台南區農業改良場玉米研究中心收穫的雜交玉米。
Hybrid corn harvested by the Corn Research Center of the Tainan DAIS.

4. 台南區農業改良場育成的雜交玉米「台南十一號」。
"Tainan No. 11," a hybrid corn variety developed by the Tainan DAIS.

雜糧作物生產

臺灣光復初期，農民種植雜糧以生產力低及生長期長的在來種爲主，品種混雜，栽培方法粗放，單位面積產量甚低。

農復會於民國四〇年代起協助農林廳各試驗場所加强雜糧作物改良工作，自品種改良着手，陸續自國外引進具有優良特性的雜糧作物品種，進行適應性選拔試驗，或供作育種材料。四十五年新竹區農業改良場選出第一個大豆改良品種「三國」，臺中區農業改良場選出第一個高粱改良品種「威士」；由於產量顯著增加，農民的栽培興趣大爲提高。

珠仔豆、青皮豆等在來種大豆，除少數可收種粒外，主要供爲綠肥之用，經協助高雄區農改場選育百美豆、十石及和歌島三個品種，豐產早熟，且可利用南部雙期作冬閑水田栽培，爲農家增加一季的收益。高屏兩縣冬閑水田現已成爲大豆主要產地，佔全省產量七〇%左右。

在農復會前委員蔣彥士博士指導下，臺南區農業改良場朴子分場於四十九年育成早熟豐產雜交玉米「臺南五號」，爲我國利用雜交優勢育種首次獲得成功。經予推廣栽培，對畜產事業的初期發展幫助甚大，同時促成種苗繁殖及種子生產的企業化。臺南五號由於具有早熟的特性，使原爲一年二作的輪作田及單期作田可一年三作，玉米成爲主要輪作作物，土地利用率因而提高。此外，並由出售雜交玉米種子的價款中抽成設立玉米基金，目前玉米研究經費大部份係由該基金利息支付。

五十年代除加强支援抗病蟲育種工作外，並推動栽培技術試驗、水分生理研究、病蟲害防治及作物營養、施肥技術等試驗；在推廣方面倡導改良生產技術綜合示範，在示範區內同時採用優良品種及栽培管理、施肥方法、病蟲害防治、灌溉排水等改良技術，以增加生產的效益。六十年代內育成推廣的抗銹病大豆品種臺農四號（農試所）與高雄三號（高雄農改場），抗露菌病雜交玉米臺南十一號（臺南農改場玉米研究中心），抗薊馬落花生品種臺南一〇號（臺南農改場）及抗蚜蟲與紋枯病雜交高粱臺中五號（臺中農改場）均爲前期抗病蟲害育種工作的成果。

進入六十年代後，大豆、玉米開放自由進口及農村勞力外移對國內雜糧生產頗有影響。爲因應此種情勢，農復會積極協助有關機構實施雜糧省工栽培試驗，並推動機械栽培。雲林及嘉南地區栽培雜糧目前多已採用大型農機整地、開溝及作畦，部份且已實施機械播種。

臺灣農場經營面積過小，生產成本高，無法與國外大面積農場競爭；但爲促進冬閑土地的利用，種植雜糧仍有需要。經建議政府勸導業者按進口數量捐助定額款項設置雜糧發展基金，並建立玉米及大豆最低保證價格收購制度，玉米、大豆的生產因而趨於穩定。

DRYLAND FOOD CROPS

The unit yields of sweet potatoes, peanuts, soybeans, corn, sorghum, etc., were quite low before 1950 owing largely to the use of inferior native varieties and practice of crude cultivation.

With JCRR assistance, PDAF and its experiment stations began to improve the production of dryland food crops in the 1950's. Superior varieties were introduced from abroad, which were either grown after adaptability tests or used for breeding purposes. The first improved soybean variety "Shankuo" and sorghum variety "Westland" were selected by the Hsinchu and Taichung district agricultural improvement stations, respectively. Released in 1956 for commercial cultivation, these two varieties aroused great interest of farmers because of their high yields.

Native varieties of soybeans, including "pearl bean" and "green bean," were planted mainly as a green manure crop in the past. Under JCRR-funded projects, three high-yielding and early-maturing varieties – Palmetto, Shih-Shih and Wakashima – were selected by the Kaohsiung DAIS. Their release has made it possible for the farmers to grow an additional crop in the winter-fallowed paddy fields in southern Taiwan. The major soybean producing areas are Pingtung and Kaohsiung, which account for about 70% of the output.

Under the guidance of Dr. Yien-si Tsiang, formerly a commissioner and now an adviser of JCRR, a hybrid corn named Tainan No. 5 was developed by the Putze substation of the Tainan DAIS in 1960. It was the first time success was achieved in using heterosis for varietal improvement of food crops. This hybrid corn substantially contributed to the early development of animal husbandry and to the promotion of commercial seed production. Due to its early-maturing and high-yielding characteristics, Tainan No. 5 has now become one of the major crops included in the multiple cropping system. With accumulations of part of the sales proceeds of its seed, a Corn Development Fund has been established. Today, most of the corn research projects are financed by the fund.

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In the 1960's, JCRR continued to support a breeding program for developing disease- and insect-resistant varieties of dryland food crops, and initiated basic research aimed at improving cultural practices, water management, pest and disease control, crop nutrition, and fertilizer application. To boost production, integrated cultivation was demonstrated and extended, which involved the use of superior varieties and improved cultural methods, proper fertilizer application, intensified pest and disease control, and well-planned irrigation and drainage.

After a decade of efforts, more new varieties were developed and extended as leading cultivars in the early 1970's. Among them were two rust-resistant soybean varieties (Tainung 4 and Kaohsiung 3), a downy mildew-resistant double-cross corn variety (Tainan 11), a thrips-resistant peanut variety (Tainan 10), and an aphid- and sheath blight-resistant hybrid sorghum variety (Taichung 5).

In recent years, owing to the liberalization of soybean and corn imports and the continuing outmigration of rural labor, the production of dryland food crops has declined considerably. To solve this problem, JCRR has been actively assisting agricultural institutions in experimenting with and developing labor-saving and mechanized cultivation. Machines are now widely used in the Yunlin, Chiayi and Tainan areas in land preparation and seeding.

Small operating scale and high production cost are two main factors limiting the output of dryland food crops in Taiwan. To promote the use of winter-fallowed land, however, it is still desirable to grow these crops. On JCRR recommendation, a development fund has been established with donations from feed grain importers collected in proportion to the quantities of their imports. The government has also set guaranteed purchase prices for locally produced soybeans and corn, which have been helpful in stabilizing their yields.

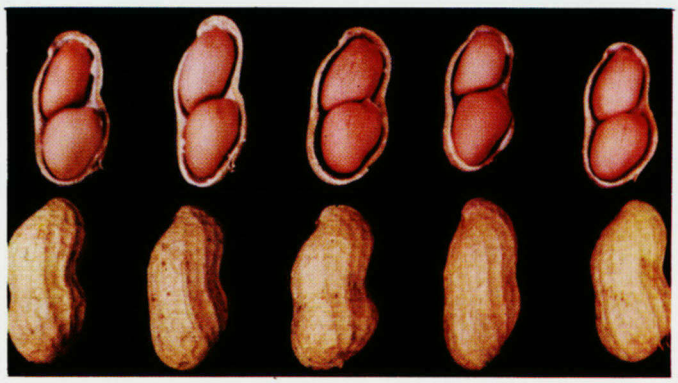
1 屏東水田裡作大豆的收穫。
Harvesting of soybeans grown as a catch crop.

2. 玉米機械整地與播種。
Preparation of land and seeding of corn with the aid of machines.

機械收穫高粱。
Mechanical harvesting of sorghum.

台中區農業改良場育成的抗蚜蟲與紋枯病雜交高粱「台中五號」，與無抗性品種「台中三號」對比情形。

Comparison of "Taichung No. 5," an aphid- and sheath blight-resistant hybrid sorghum variety developed by the Taichung DAIS, and "Taichung No. 3," a non-resistant variety.



台南區農業改良場育成的抗薊馬落花生品種「台南十號」。
Thrips-resistant peanut variety "Tainan No. 10" developed by the Tainan DAIS.

果樹生產

香蕉、鳳梨、柑桔爲臺灣的三大外銷水果，光復初期因生產萎縮曾一度暫停出口。香蕉於民國四十年初恢復外銷，出口量逐年增加，四十年代後期每年維持在三百萬箱左右。農復會鑑於當時蕉農收益偏低，外銷品腐損率過高，一方面配合有關單位改革產銷制度，大幅提高蕉農利益以迅速擴大生產面積，一方面協助臺灣大學、中興大學、青果合作社、檢驗局、港務局及農林廳等從事生產及運銷技術的改進，以減少外銷損失。五十年代後期，每年外銷量曾高達二千六百萬箱。至六十年代，菲律賓香蕉事業在美日技術及資本經營下崛起，經促成臺灣蕉業與美國聯合青果公司的合作，加强產銷改進，並成立示範區，試辦機械化包裝作業，推行蕉園排水、寬行密植、適當施肥等措施，對於提高產量及改進品質以確保臺蕉外銷市場，獲有相當成效。

民國三十七年，鳳梨罐頭的外銷漸次恢復。農復會自四十年起補助農林廳各有關場所進行行株距試驗，證明鳳梨的栽植密度由每公頃二萬五千株提高至四萬株，可有效增加生產量而不致引起萎凋病及蟲害。經全面推廣密植方法，並繁殖推廣優良正常開英品種種苗，配合栽培技術的改進，鳳梨單位面積產量大增，鳳罐出口量一度曾達每年五百萬箱。

臺灣柑桔栽培歷史甚久，但因芽條易生變異，果實外觀與品質參差不齊。經逐年補助農林廳各試驗場所，透過縣市政府及青果合作社選拔優良母樹，供種苗業者採取接穗繁殖，以維持品系的純正，並將其接木後代集中管理以供比較。近年更選出優良單株以枳殼花粉授粉，培養無病毒珠心胚系，供爲果園更新之用。

臺灣原產的小粒多纖維本地種檬果，生產極爲零星；日人曾多次自南洋引種試栽，都告失敗。農復會於民國四十三年起自美國佛羅里達州引進紅色大果檬果品種，經於鳳山及嘉義試植成功後在高雄及臺南等縣推廣，深受果農及消費者的歡迎；六十五年起並以鮮果試銷日本，反應亦佳。目前正在積極進行栽培技術的改進，將來檬果可望發展成爲一項主要的外銷鮮果。

民國四十四年及四十八年農復會協助當時的臺中農學院園藝專家組織臺灣山地園藝資源調查隊，兩度深入中央山脈實地勘查，確定了在高山生產溫帶果樹的可能性。中部橫貫公路完成後，經協助輔導會山地農場、臺灣大學及中興大學引進蘋果、梨、水蜜桃等果樹在公路沿線試植及推廣，成爲該一地區最有利的生產事業。近年來利用高山桃、梨的優良遺傳性質改良低海拔適應性强的本地品種，以期育成較佳的生食及加工用新品種。

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TREE FRUIT PRODUCTION

Bananas, pineapples and citrus fruits are three major fruit crops grown in Taiwan for export. In the first few years after World War II, owing to poor yields, the export of these fruits was suspended. Banana export to Japan was resumed in the early 1950's and its volume reached 3,000,000 boxes a year by the end of the decade. In view of the low income of banana growers and the high spoilage rate of the fruit in transit at that time, JCRR started to assist the agencies concerned in implementing a program designed to boost production, increase the growers' share of export profits, and improve the marketing system. As a result, annual exports grew to 26,000,000 boxes in the late 1960's. Strong competition, however, began to come from the Philippines where bananas were produced with Japanese-American capital and technology. In the early 1970's, JCRR helped initiate a cooperation project between the United Brands Company of the U.S. and the Provincial Federation of Fruit Marketing Cooperatives to strengthen the work on banana improvement. Under the project, 300 hectares of demonstration plots were set up for the mechanization of packaging operations, improvement of orchard drainage, use of the double planting system, and proper application of fertilizer. This has led to the production of more and better quality bananas and stabilization of the export market.

The export of canned pineapples was gradually resumed in 1948. A number of JCRR-supported research projects were started in 1950. An experiment on the spacing of pineapple plants showed that increase of the planting density from 25,000 to 40,000 plants per hectare could lead to a 34% rise in yield without causing wilt, a major disease induced by mealy-bugs. With the extension of the dense planting method and a newly developed variety, Normal Cayenne, the acreage and unit yield of pineapples greatly increased. Annual exports of canned pineapples once reached 5,000,000 cases.

1. 鳳梨密植可增加單位面積產量約百分之三十四。
   Dense planting can raise the unit yield of pineapples by 34%.
2. 台灣青果運銷合作社與美國聯合青果公司合作成立的香蕉示範區機械化包裝場。
   The modern banana packing house set up under the UBC-PFFMC cooperative project.
3. 農復會前主任委員沈宗瀚等一行在梨山視察果樹生長情形。
   JCRR officials inspecting fruit tree cultivation at Lishan.

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Cultivation of citrus fruits has a long history in Taiwan. The gradual accumulation of bud-variations, however, has often impaired the uniformity of the fruits. With JCRR support, PDAF and its experiment stations have over the years selected mother trees of constantly excellent performance to provide true-to-type scion wood to nurseries through local governments and fruit marketing cooperatives. The progeny of selected mother trees, now still kept for further improvement, has also been pollinated with pollens of trifoliate oranges. The hybrid seedlings without the trifoliate characteristics are being used to establish nucellar lines, and those having the trifoliate traits are being used in rootstock breeding programs for root-rot and nematode resistance.

The native mangoes of Taiwan are small-fruited, large-seeded and fibrous, and they are produced only in small quantities by home gardeners. During the Japanese colonial period, many mango varieties were introduced from Southeast Asia for trial cultivation, but without success. In 1954, JCRR started to introduce large red-fleshed Florida varieties — mostly chance seedlings of an Indian variety, Mulgoba. These varieties were released to the growers soon after trial plantings at Chiayi and Fengshan proved successful; they have since been popularly grown in southern Taiwan. In 1976, a trial shipment of fresh mangoes was made to Japan and the consumer response there was favorable. Efforts are now being made to improve the production methods for reducing the cost and increasing the unit area yield. In the near future, mangoes are expected to become another major export fruit of Taiwan.

In 1955 and 1959, with JCRR assistance, horticulturists of the Provincial Taichung College of Agriculture (now the National Chung Hsing University) twice organized teams to survey the slope land resources of the Central Mountain Range with a view to utilizing the high-elevation lands for horticultural development. The findings indicated the feasibility of raising deciduous fruits in the mountain regions. After completion of the Central Cross-island Highway, JCRR assisted the Vocational Assistance Commission for Retired Servicemen, the National Taiwan University and the National Chung Hsing University in introducing apples, pears and peaches from abroad for trials. Today, these fruits have developed into highly profitable crops for many areas along the highway. A research project has been in progress in recent years to cross temperate peaches and pears with subtropical ones in the hope that new varieties suitable for canning can be bred.

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1. 由美國引進的檬果新品種「聖心」，正在推廣中。
   "Sensation," a new mango variety introduced from the U.S., is now under extension.
2. 農復會前主任委員沈宗瀚及故委員錢天鶴聽取昆蟲學專家劉廷蔚有關柑桔蟲害防治的報告。
   Former JCRR Chairman T. H. Shen and the late Commissioner T. H. Chien listening to a report on citrus insect control by T. W. Lew, JCRR entomologist.
3. 在隔離網室中培養的無病毒珠心胚系，將成爲台灣柑桔老化品系及老柑園更新的主流。
   These virus-free nucellar lines of citrus, raised under isolated conditions, will be used for replanting old orchands in the future.
4. 梨山溫帶果樹產品展示會。
   Deciduous fruits produced in the Lishan area.

蔬菜生產

臺灣光復初期，蔬菜栽培面積僅約四萬公頃，種類甚少，每人每年消耗量僅四〇公斤左右。四十年代的蔬菜生產改進工作主要爲增加種類，以期藉蔬菜而增進國民健康。

農復會早在三十八年卽已開始進行蔬菜引種工作，多種臺灣過去從未栽培過的蔬菜都先後試植成功，其中包括嫩莖萵苣、四川榨菜、大頭菜、雪裡紅、芥菜、榻菇菜、青梗白菜、洋葱、金針菜、青花菜、抱子甘藍、荸薺、慈菇、蘆筍、草莓、節瓜、露地香瓜、瓜子瓜、黃秋葵等。

蔬菜引種最成功的是洋葱、洋菇及蘆筍。在民國四十三年以前，臺灣所需的洋葱全係由日本進口，每年耗費外滙約美金四十萬元。農復會於三十九年起研究在臺灣發展洋葱栽培的可行性，並協助臺北區農業改良場自國外引進短日性品種，進行各種試驗。四十一年鳳山熱帶園藝試驗分所在南部試植成功，經過區域性試驗及示範後，四十四年推廣栽培二百公頃，四十五年試銷香港，五十一年且開始外銷日本。爲解決洋葱種子的供應問題，經協助臺南區農業改良場培育耐高溫、可自行採種且適合臺灣栽培條件的新品種。六十五年育成「臺南一號」及「臺南選二號」，其產量高於推廣品種「早玉」，卽將大量繁殖推廣。目前臺灣洋葱栽培面積約爲一千公頃，外銷量年約一千五百公噸，賺取外滙達美金三百萬元。

洋菇引種工作始於四十二年，當時，一般認爲臺灣位於亞熱帶，氣溫較高，對於喜好冷涼氣候的洋菇恐不適宜。此外，國外栽培洋菇多以馬糞爲主要材料，而臺灣地區馬匹不多，也是一個重要限制因素。農復會專家認爲栽培洋菇所需土地面積不大，如能試植成功，可供爲農家副業經營。經不斷研究改良，四十五年臺灣省農業試驗所試製合成堆肥成功，臺灣省農會並建成成本低廉而構造簡單的稻草菇舍，終使洋菇生產進入經濟性栽培階段。四十六年起展開推廣，四十八年製罐試銷國外市場，至五十二年外銷數量已達一百餘萬箱。六十一年起並全面推廣密閉式塑膠菇舍，使單位面積產量由每坪十五公斤增至三十公斤以上。六十四年研究成功堆肥短期醱酵法，大幅降低生產成本。最近數年洋菇罐頭最高外銷量曾達三百四十餘萬箱，每年賺取外滙約美金五千萬元。

金針菜的引入始於四十五年，目前栽培面積約一千公頃。
Day-lily, introduced in 1956, is now cultivated on about 1,000 hectares.

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1. 嫩莖萵苣爲三十八年由美國引進，四十五年推廣。
   Asparagus lettuce was introduced from the U.S. in 1949 and extended in 1956.

2. 青梗白菜爲四十二年引進，四十五年推廣。
   Green petiole cabbage was introduced in 1953 and extended in 1956.

VEGETABLES

In the early period of Taiwan's retrocession, only a few kinds of vegetables were produced. The total crop area was about 40,000 ha, and the annual per capita consumption around 40 kg. The improvement work in the 1950's focused on making more kinds of vegetables available to the consumers.

JCRR began to introduce from abroad new vegetable crops as early as 1949. Through years of experimentation, many crops which had never been grown in Taiwan before were successfully cultivated and extended. They included asparagus lettuce, Szechwan mustard (*Brassica juncea* var. *tumida*), red-in-snow mustard (*Brassica juncea* var. *multiceps*), Chinese flat cabbage (*Brassica chinensis* var. *resularis*), green petiole cabbage (*Brassica chinensis* var. *chinensis*), onion, day-lily (*Hemerocallis flava*), broccoli, Brussels sprouts, waterchestnut (*Elecocharis tuberosa*), arrowhead (*Sagittaria trifolia* var. *sinensis*), asparagus, strawberry, mushroom, jointed gourd (*Benincasa hispida*), honeydew melon, seed watermelon, and okra.

The most successful introductions were onions, mushrooms and asparagus. Before 1954, some US$400,000 worth of onions had to be imported from Japan every year. In 1950, JCRR began to study the possibility of developing onion production in Taiwan and assisted the Taipei DAIS in collecting short-day varieties from abroad and conducting planting trials. In 1952, the Fengshan Tropical Horticultural Experiment Station carried out a regional adaptability test of these varieties and found the Kaohsiung-Pingtung area suitable for onion growing in the dry and cool winter. In 1955, 200 ha was planted; the yield was not only enough for local consumption but left a surplus which was exported to Hong Kong in the following year. With the improvement of cultural techniques and expansion of acreage, large quantities of onions have been exported to Japan annually since 1962. For the supply of onion seeds, a breeding program was started by the Tainan DAIS in 1959. Two new heat-resistant varieties were successfully developed in 1976. Nomenclatured Tainan No. 1 and Tainan Selection No. 2, they have a longer storage life, yield higher and mature 10–15 days earlier than the extension variety Early Grano. At present, the total onion acreage is about 1,000 ha, and annually some 15,000 M.T. worth US$-3,000,000 are exported.

蘆筍爲溫帶長期作物，外國蘆筍專家曾公開表示臺灣絕無大量生產蘆筍的可能性。農復會爲發展新興作物，並鑒於蘆筍在國際市場的銷售潛力頗大，四十二年起協助臺北區農業改良場進行蘆筍引種及有關試驗研究。在試驗初期，產量不高，生育情況也差，經多年研究後，創行「留莖栽培法」，獲得突破性的進展，使我國成爲亞熱帶及熱帶地區唯一栽培蘆筍成功的國家。五十一年開始推廣及試銷，最近數年，每年外銷數量均在三百五十萬箱以上。六十六年，外銷金額且超過美金一億元。

多數新興蔬菜至五十年代已建立良好的推廣系統，開始大量生產外銷，蔬菜改良工作也由引種進入育種時代。臺北區改良場育成臺北一號及臺北二號胡瓜；新竹區改良場育成五峰種四川榨菜及五峰三號馬鈴薯；臺南區改良場育成臺南二號及臺南七號洋香瓜、臺南一號甘藍、臺南八號番茄、臺南一號及臺南選二號洋葱；臺灣省農業試驗所鳳山分所育成鳳山極早生、鳳山早生、鳳山中生及鳳山晚生花椰菜、鳳山白菜、鳳山選一號及鳳山選二號大蒜、鳳山雜交一號番茄等。

三倍體無子西瓜爲日本木原生物研究所培育成功，但因栽培較費人工，日本已甚少生產。農復會於四十五年協助鳳山熱帶園藝試驗分所從事三倍體無子西瓜的育種，先後解決了四倍體種子處理及繁殖等技術問題，四十八年育成鳳山一號至九號等九個三倍體無子西瓜品種。五十年起推廣鳳山一號品種並外銷香港。我國現爲唯一大規模經濟栽培及外銷無子西瓜的國家。

臺灣地區夏季氣候炎熱，生產蔬菜較爲困難，經補助臺北區農業改良場改進夏季蔬菜栽培。六十年研究成功以塑膠網室栽培蔬菜，翌年補助設置塑膠網室一〇六處。塑膠網室有降低氣溫、防風及防雨的功效，且因與外界有隔離作用，病蟲害亦較少，生產的蔬菜品質優良，甚受消費者的歡迎。

爲減少颱風對蔬菜生產的影響，農復會於六十三年推廣蔬菜田覆蓋塑膠布的栽培法，在颱風來臨前以大張塑膠布覆蓋蔬菜田圃，四周用石塊或泥土鎮壓，可防止風吹雨打對蔬菜葉面造成的損害；颱風過境後，再將塑膠布收存。此種方法簡單而有效，已爲菜農普遍採用。

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1. 台南農改場於六十五年育成的洋葱品種「台南一號」。
   The onion variety "Tainan No. 1," was developed by the Tainan DAIS in 1976.
2. 每年爲我國賺取大量外匯的洋菇。
   Mushrooms are a major foreign exchange earner of Taiwan.
3. 台灣農業試驗所六十五年研究成功的堆肥短期醱酵法，現已普遍爲菇農採用。
   The new method of compost making developed by TARI in 1975 has now been generally adopted by mushroom growers.

Mushrooms thrive in cool climates. In subtropical Taiwan, production of this crop was once considered impossible. As mushroom cultivation requires little land space, JCRR specialists thought that it would provide a good sideline for farmers if a trial proved successful. It was out of this idea that the introduction of mushroom varieites from abroad began in 1953. In the next few years, continued efforts were made to improve the cultural techniques. As a substitute for horse manure, which is traditionally used in mushroom cultivation in foreign countries and lacking in Taiwan, TARI developed a synthetic compost in 1956, and the Provincial Farmers' Association also worked out a simple design for mushroom houses using bamboo and rice straw. All this eventually made the commercial production of mushrooms a reality. In 1958, for the first time canned mushrooms were exported, and the volume of exports exceeded one million cases in 1963.

Since 1972, with the extension of PE mushroom houses of the closed type, the unit yield has increased from 15 kg/ping to more than 30 kg/ping (1 ping = 3.3 sq. m.). The development of a new fermentation method in 1975, which shortens the time of compost making to five days, has much reduced the cost of production. Meanwhile, the annual exports of canned mushrooms have continued to climb, now reaching 3,400,000 cases in quantity and US$50,000,000 in value.

It is often a surprise to foreign horticulturists that asparagus, a perennial vegetable of the Temperate Zone, could have been developed into a major export item in Taiwan. In 1953, with JCRR assistance, the Taipei DAIS began to introduce from abroad asparagus varieties for trial planting. At the early stage of experimentation, production was rather low. A breakthrough was made in 1955 with the development of a mother stalk method which greatly boosted the unit yield. Since then, asparagus has been booming as an important economic crop. In the last several years, the annual exports of canned asparagus have averaged 3,500,000 cases; more than US$100 million in foreign exchange was earned in 1977.

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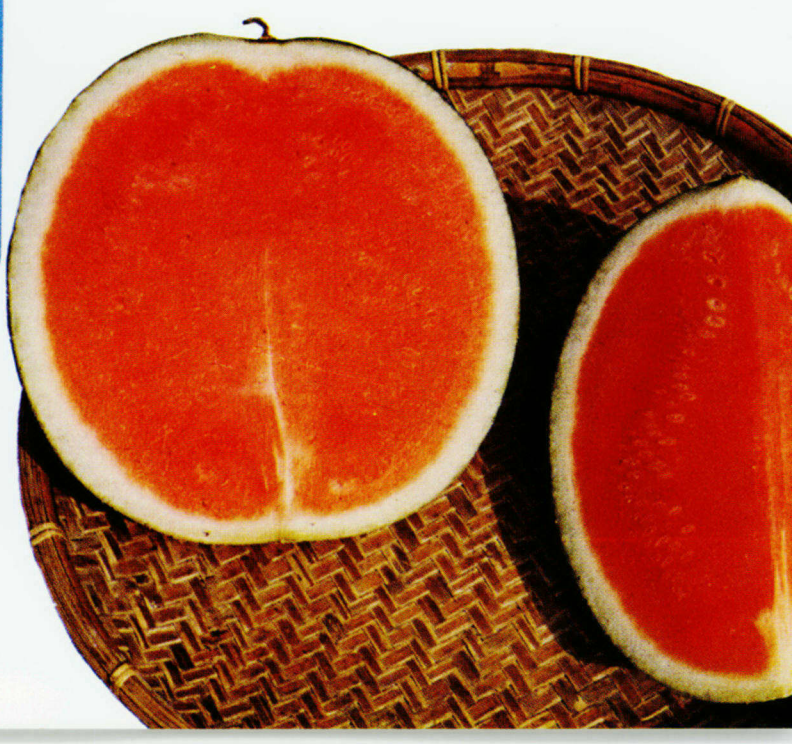
1. 蘆筍田。
   An asparagus field.

2. 鳳山極早生花椰菜定植後四十五天即可採收，適合夏季栽培。
   "Fengshan Extra Early," a new cauliflower variety of excellent quality, can be harvested 45 days after transplantation.

鳳山選二號大蒜，蒜粒大，產量高。
Large-bulbed and high-yielding garlic variety "Fengshan No. 2."



By the 1960's, a sound system for the extension of the introduced vegetables had been established and large scale production began. Emphasis in vegetable improvement shifted to breeding. During this decade, new varieties of many crops including cucumber, Szechuan mustard, potatoes, melons, cabbage, onions, cauliflower, Chinese cabbage, garlic and tomatoes were developed by the various agricultural experiment stations.

Breeding of seedless triploid watermelons was first attempted in 1939 by the Kihara Institute for Biological Research of Japan. Success was achieved in 1947, but commercial production did not follow because of its high labor requirement. In Taiwan, the Fengshan THES started breeding experiments in 1956 with JCRR financial support. In 1959, the station successfully developed nine varieties (Fengshan Nos. 1-9) after solving the technical problems of seed treatment and multiplication. Fengshan No. 1 was extended in 1961 following a series of regional trials and demonstrations. In the next year, seedless watermelons began to be exported to Hong Kong. So far, the Republic of China is still the only country that exports this kind of melon.

To improve the supply of vegetables in summer, a season characterized by high temperatures, heavy rains and frequent typhoons, the Taipei DAIS has developed a screenhouse culture method under a JCRR-supported research project. The screenhouse has the advantages of: (1) reducing the force of winds and rains, (2) keeping insects out, (3) maintaining a temperature suitable for vegetable growing, and (4) raising the quality of leafy vegetables. So far, 106 screenhouses (0.1 ha in size and 2 meters in height) have been erected on the outskirts of Taipei city.

Tropical rain storms and typhoons, which occur in June through October, often cause heavy damage to crops. In 1974, JCRR introduced the use of large plastic sheets for the protection of vegetables. Before a storm comes, vegetable gardens can be covered with the sheets to be secured by placing stones or clay on edges. Afterwards, the sheets can be removed for future use. This simple and effective method has now been widely adopted by vegetable growers.

無子西瓜「鳳山一號」爲四十八年育成，五十年推廣。
"Fengshan No. 1," a seedless watermelon variety, was developed in 1959 and extended in 1961.

3. 無子西瓜田間作業。
Field work for the production of seedless watermelon.

4. 網室種菜。
Screenhouse cultivation of vegetables.

花卉事業的發展

臺灣花卉事業的發展起步較晚，四十年代全省專業花農僅有二一二戶，經營總面積不過四十餘公頃，以栽培小菊花、百合等普通花卉爲主。農復會鑑於花卉作物經濟價值甚高，五十三年首先自國外引進水仙、唐菖蒲等新品種，並與政府有關機關共同輔導生產。至五十年代後期，花農已增加至六七四戶，總面積達二三四公頃。

爲配合臺灣花卉事業的發展，經會同經濟部國際貿易局等機關輔導業者於六十年成立財團法人臺灣區花卉發展協會，負起開拓花卉外銷的任務。自五十六年至六十年間，每年花卉外銷價值達新臺幣二千餘萬元。

至六十年代，臺灣花卉事業更形發達。爲進一步促進花卉外銷，經協助學術機關及農業改良場等從事研究工作。在菊花改良方面，採行夜間照明方法控制開花時期及改善品質；實施間隔照明，降低生產成本；並加强田間檢疫及病蟲害防治，對菊花外銷事業的發展幫助甚大。

在育種方面，協助培育多花型杜鵑花及新品種松葉牡丹，初步已獲得成功，即可展開繁殖推廣工作。

近年來爲增加外銷花卉的種類，經引進優良品種康乃馨委由專家研究試種。另研究成功一種新的高架栽培方法，已會同國貿局及農林廳等單位予以推廣。

爲加强推廣示範研究成果，經與農林廳合作於六十二年輔導彰化縣農會在北斗鎮設立花卉推廣中心，負責向花農推介新品種及新栽培技術。

臺灣花卉的內銷市場，近年來亦因農復會與臺灣省政府、臺北市政府等機關聯合舉辦假日花市的活動而大爲擴展，對成長中的花卉事業具有安定與鞏固的作用。

經過多年來的努力，臺灣的花卉事業發展極爲迅速。花農數現已超過二千一百戶，約爲早期的十倍；栽培面積已超過二千公頃，爲早期的五十倍；花卉外銷價值則超過八千萬元，爲早期的四倍。

唐菖蒲花田。
A gladiolus farm.

菊花產地夜間照明情形。
Chrysanthemums under light treatment.

盛開中的水仙。
Narcissuses in bloom.

花卉發展協會在國外舉辦的台灣花卉展覽。
A flower exhibition held by the Taiwan Floricultural Development Association.

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FLORICULTURAL DEVELOPMENT

The development of commercial floricultural production in Taiwan had a rather late start. In the 1950's, only a few varieties of small chrysanthemum and lily were grown by 212 farmers on a total of 40 ha of land. In view of the high economic value of flowers, JCRR introduced superior varieties of narcissus and gladiolus from abroad in 1964 for trial cultivation, acclimatization and extension. In the late 1960's, the number of flower growers increased to 674 and the acreage expanded to 234 ha.

In order to promote the development and export of flowers, a Taiwan Floricultural Development Association was established jointly by the Board of Foreign Trade and JCRR in 1971. Through its efforts, the annual flower exports averaged more than NT$20,000,000 during 1967-1971.

The floricultural industry of Taiwan showed further growth in the early 1970's. To improve the quality of flowers, JCRR has in recent years assisted various academic and agricultural institutions in undertaking many a research project. In chrysanthemum improvement, for example, a method for treating the plant with light at night to control its blooming time has been successfully developed. With intermittent light-treatment, the production cost can be reduced. This plus proper control of diseases and insect pests has contributed much to the increased production and export of chrysanthemums.

Some new varieties of multiflower-type rhododendron and portulaca have been bred successfully. Their multiplication and extension will soon begin.

Superior varieties of carnation have been introduced from abroad in recent years, and a high-frame growing technique has been developed and extended with the assistance of the Board of Foreign Trade, PDAF and JCRR.

In 1973, a flower extension center was established at Peitou in Changhua county jointly by the Changhua County Farmers' Association, PDAF and JCRR. New varieties and cultural techniques have since been extended to the local farmers through this center.

The domestic demand for flowers has been much stimulated by the "holiday flower market" sponsored jointly by the Taiwan Provincial Government, the Taipei Municipal Government and JCRR. This activity has had a stabilizing effect on the developing floricultural industry.

Through years of hard efforts, floriculture in Taiwan has grown rapidly. Now, flower growers number some 2,100, almost 10 times as many as before; the acreage of flowers has increased to 2,000 ha, 50 times that before; and the annual exports are valued at more than NT$80,000,000, about four times that in the earlier days.

北斗花卉推廣中心。
The Peitou Flower Extension Center.

1. 台北假日花市一景。
   The Holiday Flower Market in Taipei.
2. 多花型杜鵑。
   A multiflorous variety of rhododendron.
3. 新品種松葉牡丹。
   A new variety of portulaca.

特用作物生產

茶

臺灣在光復初期約有茶園四萬七千公頃，多因戰亂而荒廢或管理不當，每公頃粗茶產量僅及三百公斤。爲振興臺灣茶葉及改善茶農生活，農復會於民國四十七年至五十一年與平鎮茶業試驗分所（現稱茶業改良場）合作，在卅七個鄉鎮茶區舉辦「茶園耕作法改良」示範，項目包括茶樹剪枝、採摘、施肥及病蟲害防治。結果使全省粗製茶平均單位收穫量由三五三公斤增至五四八公斤，五年間增產達五五%，導致茶園普遍復甦。示範茶園先後共設置一二、〇〇〇公頃，佔茶園總面積的三分之一。

五十一年協助農林廳辦理茶園調查，瞭解全省茶園品種、面積、樹齡、坡度及缺株狀況。根據調查結果，五十一年起先自高級茶區的臺北縣開始，協助地方政府淘汰劣種及更新老株，以後逐步推展，歷年來更新茶園共達六、五〇〇公頃。目前早植地區都已陸續成園，每公頃鮮葉產量最少亦有一二、〇〇〇公斤，較舊有衰老茶園增產三倍以上，茶菁品質亦大爲提高。

近十多年來，由於農村勞力大量外流，各地茶園常因缺乏人工以致雜草叢生，茶菁無法適時採摘而任其老化。經再策劃擬訂茶園機械耕作計畫，推廣使用機械剪枝、耕耘機中耕除草及手提式電動機械採菁。較集中的茶區多已應用簡易機械代替人工，尤以採茶機使用最爲普遍。

半酸酵茶（包括烏龍茶及包種茶兩大類）爲臺灣特產，以往因使用手工製造，品質差異甚大，且無法大量生產。經於五十八年起協助茶業改良場從事「半酸酵茶製造機械化」的研究，六十五年完成熱風萎凋及連續式揉捻及解塊機械。機製包種茶或烏龍茶在風味上與手工製造者極爲近似，但製茶效率可提高三倍，而生產成本則僅及其半。民間茶廠已相繼採用此種機械製茶，成爲臺灣茶業史上一大技術創新。

經過三十年來的研究改良，茶葉生產技術已有長足的進步。六十二年特別配合加速農村建設重要措施，與農林廳合作在全省五大茶區分別成立「茶葉生產專業區」，主要工作爲組訓茶農，推行病蟲害防治共同作業，應用機械採茶、整枝、中耕及除草，以降低農務生產成本。在製銷方面則輔導專業區內青年茶農合作創設「共同製茶工廠」，將本身所產的茶菁自行加工製成茶葉，並透過合作方式直接運銷，達成產製銷一貫經營的目標。

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1. 利用手提式動力採茶機採茶。
   Plucking of tea leaves with a portable machine.

2. 一處五年生更新茶園。
   A 5-year-old rejuvenated tea plantation.

SPECIAL CROPS

Tea

There were about 47,000 ha of tea plantations in Taiwan at the end of World War II, most of which were left uncultivated because of the war.

In the early postwar period, owing to the lack of planting material and fertilizer and the use of backward cultural methods, the average per ha yield of tea leaves was less than 300 kg.

In order to restore tea production, a large-scale demonstration of improved plantation management covering pruning, plucking, fertilization, and disease/insect pest control was carried out by the Taiwan Tea Experiment Station (TTES) with JCRR assistance in 37 tea-growing townships in 1958-1962. As a result, the unit yield of crude tea rose from 353 kg to 584 kg per ha, showing a 55% increase for the five-year period, and about 12,000 ha, or one-third of the total tea acreage, were rejuvenated.

In 1962, JCRR started to help PDAF conduct an island-wide survey of tea farming conditions and carry out a program for replacing the old tea bushes with high-yielding clonal material. After 15 years of efforts, 6,500 ha of plantations were replanted. A recent investigation showed that the average leaf yield of the rejuvenated plantations reached 12,000 kg/ha, three times that of the old plantations.

To improve management and ease labor shortage in tea production, a project for promoting the use of machines in weeding, tilling and pruning was initiated in 1968. After 10 years of demonstration and training, a portable plucking machine is now widely used in tea-producing areas.

Semi-fermented tea, including *oolong* and *pouchong*, is a special product of Taiwan. In the past, processing was done entirely by manual labor, so the yield of made-tea was low and its quality varied with the lots and the manufacturers. To improve production, JCRR in 1969 began to assist TTES in formulating a mechanical processing method for *pouchong* and *oolong*.

After seven years of intensive studies, an integrated process was developed. It involves the use of automatic machines for artificial hot-air withering, shaking, panning, rolling, breaking and drying of tea leaves in one continuous operation.

The new method is three times as efficient, and produces made-tea of the same cup quality, as the traditional manual method. By this improved process, both *pouchong* and *oolong* tea can now be mass-produced.

Since 1973, a project for the establishment of "specialized tea production areas" has been carried on in Taipei, Taoyuan, Hsinchu, Miaoli, and Nantou counties. The project provides mainly for organizing the farmers for cooperative management; helping them to adopt improved methods of plucking, pruning, weeding, and fertilization; and encouraging young tea-growers to set up tea-making plants and engage in joint marketing of their products. These measures have stimulated the farmers to work harder on their lands, knowing that they stand to reap and enjoy the fruit of their own efforts.

自動連續式半醱酵茶製造機械設備。
Machinery for semi-fermented tea manufacture.

苗栗茶葉生產專業區噴灌示範茶園。
Demonstration of sprinkler irrigation in a specialized tea production area in Miaoli.

黃麻採收情形。
Harvesting and retting of jute.

黃　麻

黃麻在四十年代爲嘉南旱地輪作區最重要的經濟作物，供爲當時糖、米、雜糧等包裝袋的主要材料。每年栽培面積都在一萬公頃左右，精洗麻收穫量亦在一萬五千公噸以上。爲改善黃麻纖維品質及提高單位面積產量，農復會曾補助臺南棉麻試驗分所從事品種改良、栽培技術改良及研究黃麻精練技術。四十九年會同物資局在雲林、嘉義、臺南及高雄四縣建造三十九座新型浸麻池，使黃麻纖維品質普遍提高。五十年九月更協助棉麻試驗分所建立一座遠東惟一完善的「長纖維品質測定室」，及邀請美籍專家舉辦纖維測定技術訓練。近十餘年來，因人造纖維工業發展迅速，合成纖維已取代多數天然纖維的用途，纖維作物日見式微，或已停止生產，但黃麻對過去的農村經濟曾有極大的貢獻。

蠶　業

臺灣的自然環境適宜栽桑養蠶，發展蠶業並可提高旱地及淺坡山地的利用價值。二十年來，農復會除補助蠶業改良場從事基本試驗研究外，並先後協助農林廳辦理多項改進示範計畫。六十二年再配合加速農村建設重要措施在全省設置「蠶業生產專業區」五處，更新家蠶品種，採用條桑養蠶，實施病蟲害共同防治，獎勵集約栽桑及使用廻轉簇取代舊式的稻草簇。生產勞力大幅減少，產量與品質則顯著提高。

在副業養蠶的經營方式之下，每張蠶種收繭量僅有七・六五公斤，成立蠶業生產專業區後，單位產量逐年增加，目前平均都在二〇公斤以上。

臺灣蠶業的振興，除得力於品種及生產技術改良使農民收益增加外，更重要的是建立了合理的經營體制，使農工雙方利益都獲得保障。最近十年來，農復會與農林廳合作先後研訂專業區統一契作制度、蠶繭價格計算辦法及稚蠶共育制度。此外，輔導業者籌建絲廠發展加工事業，並設置蠶業發展基金。在這些有利條件之下，蠶業已逐漸發展成爲一項極具經濟價值的農產事業。

1. 使用舊式稻草簇，蠶繭易污染，繭形不齊，同時繅絲時生絲易斷落。

   Mounted on old-fashioned straw frames, the cocoons are irregular-shaped and their filaments break easily.

2. 新式紙製廻轉簇，繭形好，質白，容易繅絲。

   With the use of a newly developed rotary frame, the quality of cocoons can be much improved.

Jute

In the 1950's, jute was a major economic crop in the dry-land areas of Chiayi and Tainan counties, providing material for making gunny sacks for export rice and sugar. During the period 1950-1961, about 10,000 hectares were planted to jute annually, producing 15,000 metric tons of retted fiber.

In 1949 JCRR began to assist the Tainan Fiber Crops Experiment Station (FCES) in strengthening its work on jute improvement and study of retting techniques. In 1951, 39 new-type retting ponds were built in major jute-growing townships for producing quality retted fiber. A Long Vegetable Fiber Testing Laboratory was established at the Tainan FCES in 1961 at the suggestion of the U.S. Department of Agriculture. The only modern facility for testing long natural fibers in Asia, the laboratory has been helpful in the betterment of fiber quality in Taiwan.

Sericulture

The climatic conditions in Taiwan are favorable to the planting of mulberry trees and rearing of silkworms. To promote sericultural development, JCRR during the past two decades has assisted the Taiwan Sericultural Improvement Station (TSIS) and PDAF in carrying out various research, experimental and demonstration projects aimed at the varietal and cultural improvement of both silkworms and mulberry trees.

Under the Accelerated Rural Development Program, five Specialized Sericultural Production Areas have been set up in Miaoli, Nantou, Tainan, Pingtung, Taitung, and Hualien counties since 1973. The activities pushed in these areas include renewal of silkworm and mulberry varieties, use of improved sericultural techniques, cooperative disease and pest control, and concentrated mulberry planting. As a result of these efforts, the yield of fresh cocoons per egg sheet has increased from 7.65 kg in 1956 to more than 20 kg at present.

Sericulture has developed into a highly profitable enterprise in the last decade. Contributing factors are the improvement of sericultural practices, establishment of systems for contract production and purchase of cocoons at reasonable prices, organization of farmers for joint raising of young silkworms, and setting up of a sericultural development fund for the benefit of both farmers and manufacturers.

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農產品加工的發展

農產品加工是農業中重要的一環，且有溝通農工兩部門間的橋樑作用。農復會於民國四十四年起開始協助推動農產品加工業的發展，最初數年內鼓勵農家利用自產原料加工後供自食及銷售國內市場。產品包括醬油、榨菜、殺菌瓶裝豆乳、脫水蔬菜等。

四十年代後期，爲解決農村勞力過剩問題，並爲充份運用臺灣西海岸看天田的土地資源，協助發展新產品外銷，以增加農民收益。先以兩年時間改進外銷鳳梨罐頭因膨罐及高黴菌含量而遭退貨的技術問題，奠定臺灣罐頭食品外銷的基礎。四十八年，在國內市場滯銷，洋菇面臨生產廢棄的情況下，倡導以洋菇加工製罐並試銷歐美獲得成功後，臺灣洋菇產量激增（五十六年居世界首位）。五十二年繼洋菇之後，再推動新產品蘆筍罐頭外銷，由於首倡蘆筍去皮處理，在歐洲市場占有率高達九〇%，產量亦佔世界第一位。

最近十餘年，爲加强食品科技的研究，提高臺灣外銷食品的競爭力，先後協助政府及業者在新竹設立食品工業發展研究所，建立農產品加工農工合作制度，並推行技術輔導。經五年餘的研究，已克服蘆筍罐頭含錫量污染的問題，並改善低酸性罐頭食品殺菌操作及衛生控制等技術。國產蘆筍及洋菇罐頭在國際市場得以繼續成長，外銷金額年達兩億美元。最近發展成功的黑皮波羅門參罐頭新產品，外銷反應亦佳。

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DEVELOPMENT OF FOOD PROCESSING

Food processing is an integral part of agriculture. It helps solve the problem of overproduction, regulate market supply, and increase farmers' earnings. JCRR started promoting the development of food processing in 1958. In the beginning, the farmers were encouraged to process their produce at home mainly for the domestic market and for their own consumption. The processed products included soybean sauce, pickled mustard stems, soybean milk and dehydrated vegetables.

In the late 1950's, to resolve the problem of surplus farm labor and to fully utilize slope land resources on the west coast, efforts were made to develop new products for export. In food processing, JCRR first assisted canneries to reduce the spoilage rate and mold count of canned pineapples, and then, in 1959, initiated a program for production and trial export of canned mushrooms to Europe and the United States. The success of mushroom export has subsequently led to tremendous increases in the yield of this crop, making Taiwan one of the world's largest producers. Another product which was developed with JCRR assistance was canned peeled asparagus. First exported in 1963, this item presently accounts for 90% of the European market.

In recent years, to strengthen research in food science and technology and further promote agricultural exports, JCRR has assisted in the creation of a Food Industry Research and Development Institute at Hsinchu and setting up of a cooperative system between the food industry and raw material producers. Through several years of studies, the problem of tin contamination of canned asparagus has been satisfactorily solved, and technical improvements have also been made in the sterilization and sanitary management of low-acid foods. This has greatly helped the growth of Taiwan's canned food exports. The newest item on the export list is canned black salsify developed in 1976, which has been favorably received by foreign consumers.

1. 洋菇加工。
   Mushroom canning.
2. 蘆筍加工。
   Asparagus canning.

林業建設

民國四十年，農復會成立森林組，開始協助推動臺灣林業建設工作，初期內主要工作包括建立耕地防風林，計完成五千公頃；擴大辦理復舊造林，自四十二年起造林面積由一萬餘公頃增至三萬公頃；自國外引進新樹種，促進林木的改良；推行森林保護、林業研究及外島造林工作；邀請外國林業專家來華研究臺灣林業問題，提出有關基本林業政策及經營目標的建議；引進及研究改進水土保持技術，並大面積推行。

初期的林業建設告一段落後，農復會爲促成森林保續經營的目的，積極協助推動森林資源保育及竹木加工技術等改進工作，現仍繼續進行中。

引進速生樹種及改進育林技術

藉林木改良培育森林資源，以採取引種方式效果最大。農復會於四十四年起由美國及澳洲引進南方松類及桉樹，推廣成績甚佳。五十年以後引進速生林木及竹類，至今總數已達數百種。經試植證明可供推廣的有卡鄧伯木、梨果竹、荖濃巨竹及馬來甌竹；已大量推廣栽植的有濕地松、可可椰子、麻六甲合歡、黑板樹、南洋杉、檸檬桉及大葉桉等。

民國五十年以後，國內經濟發展迅速，農村勞力漸次移入都市，而山地勞工更形缺乏。經協助各大學及林業試驗機構，研究以小型機械及除草劑代替人工作業，均獲相當成效，並在若干地區推廣。六十年起積極研究改進育林方法，發現以橫坡步道造林方法配合機械及藥劑除草，可節省大量人工，又可兼收水土保持的效果，目前推廣面積已達四千公頃。另爲推行簡易機械造林，六十二年起輔導林業團體在各地成立十五個造林機械隊，參加國有林及公私有林地造林工作。

1

2

1. 五十年代由馬來西亞引進椰子在南部栽植，現已結實。
   Coconut palms introduced from Malaysia in the 1960's have been planted both as shade trees and as a plantation crop.
2. 昔年種植的柳杉，今已蔚然成林，多數已達伐期。
   Cryptomeria trees planted in the early 1950's have grown up and some have been harvested.
3. 農復會前技正康瀚視察自馬來西亞引進的紅樹在海灘地造林。
   JCRR expert Kang Han inspecting the growing condition of mangrove seedlings planted on tidal land.
4. 南投縣鹿谷鄉造林機械隊。
   The mechanized reforestation team of Luku township, Nantou county.

Forestry Development

3

4

JCRR began to support Taiwan's forestry development in 1951 following the establishment of its forestry division. Major activities carried out in the early years included: (1) establishment of windbreaks on 5,000 hectares of farmland; (2) expansion of the annual reforestation area from 10,000 ha in 1952 to 30,000 ha; (3) introduction of new exotic tree species for timber improvement; (4) promotion of forest protection, forestry research, and afforestation on outlying islands; (5) invitation of foreign forestry experts for advice on basic forestry policies and forest management; and (6) introduction, improvement and extension of soil conservation methods.

In recent years, JCRR efforts have been centered on the conservation of forest resources and improvement of wood and bamboo processing techniques, which are still continuing.

INTRODUCTION OF FAST-GROWING TREE SPECIES AND IMPROVEMENT OF SILVICULTURE

Under the tree introduction program initiated by JCRR in 1955, American southern pines and Australian eucalyptus were introduced and have been extensively planted. Among the several hundred fast-growing tree species and bamboos introduced after 1960, the following have been found highly adaptable in planting trials: (1) *Anthocephalus chinensis,* (2) *Melocanna baccifera,* (3) *Dendrocalamus giganteus,* and (4) *Dendrocalamus asper.* Among those which have been extensively planted are: (1) *Pinus elliottee,* (2) *Cocos nucifera,* (3) *Albizzia falcata,* (4) *Alstonia scholaris,* (5) *Araucaria excelsa,* (6) *Araucaria Cunninghamii,* (7) *Eucalyptus robusta,* and (8) *Eucalyptus citriodora.*

Continuing outflow of rural labor due to rapid economic growth has affected the progress of reforestation since the early 1960's. To solve the labor shortage problem, studies on the use of light machines and herbicides in lieu of manual operations have been carried out by related research agencies and universities with JCRR assistance. Some of the machines and chemicals have already been employed in a number of forest districts.

In order to achieve better labor efficiency, efforts have also been made to study improved reforestation techniques since 1971. It has been found that the horizontal path planting method combined with mechanical or chemical weeding can not only cut down labor requirement but also help soil conservation. So far, approximately 4,000 hectares have been reforested with this method. To promote mechanized reforestation, 15 working teams equipped with light forestry machines have been organized in the last few years to help with the reforestation work on both public and private forest lands.

1

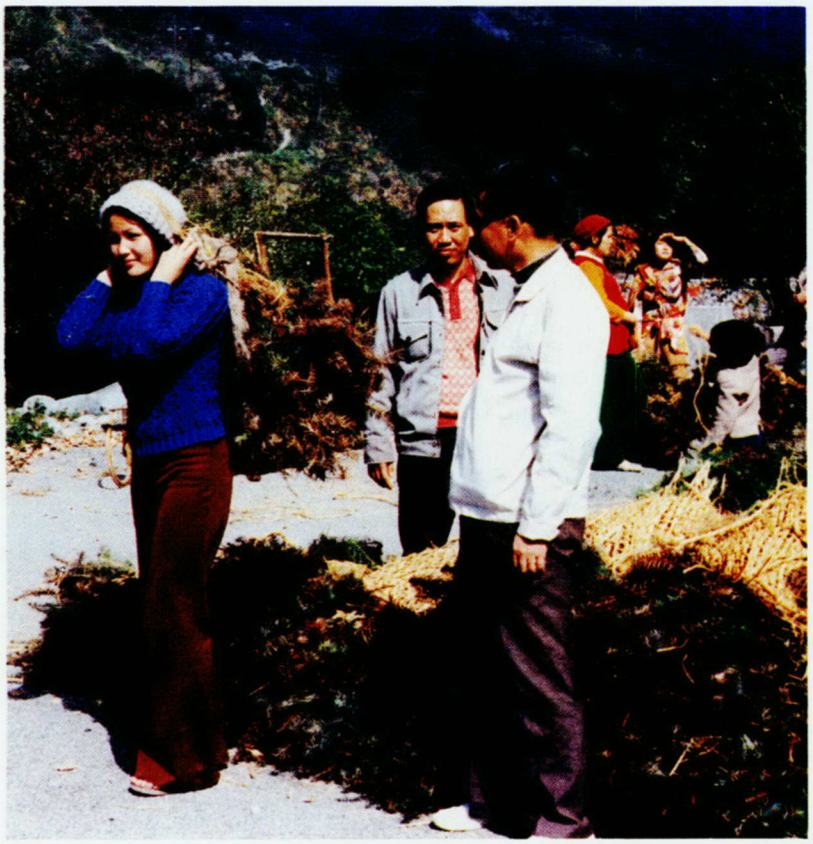
營造防風林及山地保留地造林

臺灣易受季風及颱風侵襲，農田及住屋年有損害。農復會於四十年起參與防風林的整建，六十二年起更將防風林工作列於中央加速農村建設重要措施項下，配合林務局經費協助地方政府加速營造。六十六年底，海岸防風林面積已達四千五百公頃，並在十四萬公頃的農地上栽植耕地防風林。

臺灣二十四萬公頃山地保留地中，有八萬四千餘公頃應實施造林，以涵養水土及提高土地生產力。經於六十五年度起與臺灣省政府民政廳及林務局共同成立山地保留地造林計畫，預定八年完成。過去兩年內已完成造林面積達一八、六四四公頃。

1. 濕地松爲早年自美國引進。
   A 15-year-old stand of slash pine (Pinus elliottee), which was introduced from the U.S. in the early 1950's.
2. 山地同胞領取苗木準備造林。
   Distribution of tree seedlings to aborigines.

2



海岸防風林建造前的定砂工作。
Sand-arresting fences are erected prior to the planting of coastal windbreaks.

3

PLANTING OF WINDBREAKS

Taiwan is subject to the attack of typhoons and monsoons which often cause severe damage to crops and farmhouses. Since 1951, JCRR has taken an active part in the establishment of windbreaks. Under the Accelerated Rural Development Program, a project for large-scale windbreak planting has been carried on by local governments and the Taiwan Forestry Bureau. As of the end of 1977, a total of 4,500 hectares of coastal forests and 140,000 hectares of farm windbreaks had been established.

REFORESTATION IN ABORIGINAL RESERVATIONS

Of the 240,000 hectares of aboriginal reservation lands, 84,000 hectares are in need of reforestation to prevent soil erosion and increase land productivity. Under a project jointly sponsored by JCRR, the Provincial Department of Civil Affairs and the Taiwan Forestry Bureau, a total of 18,644 hectares of such lands have been planted with economic tree/bamboo species since FY1976.

4

3. 橫坡步道造林配合機械除草可節省人工百分之三十七，且有利於水土保持。

   Horizontal path planting combined with mechanical weeding can reduce labor by 37% and promote soil conservation.

4. 六十二年在彰化沿海地區所建耕地防風林。
   Coastal farm windbreaks planted in 1973.

木麻黃造林一年後生長情形。
A one-year-old casuarina plantation.

興建產業道路

爲發展山區及鄉村交通以利農產品運輸，農復會於五十一年起利用美援四八〇公法及聯合國世界糧食方案贈與的糧食，配合當地居民提供的勞力，共開闢可供卡車行駛的產業道路七十二條，總長七四七公里。六十年外援停止後，鑒於產業道路對地方建設及農村經濟的重要性，六十二年起在中央加速農村建設措施項下繼續實施，過去五年內完成新路二一五條，總長達八四〇公里。產業道路除有利於山地資源的開發，提高土地利用效益外，對改進山地鄉村居民的生活及便利居民子弟就學亦有助益。

1

2

FOREST AND RURAL ROAD CONSTRUCTION

To facilitate transportation in foothill areas, 72 forest roads totaling 747 kilometers in length were constructed by the local people concerned during 1962-1971 with JCRR subsidies provided in the form of food commodities made available under the U. S. PL480 "Food for Work" and U. N. "Work for Peace" programs. An additional 215 roads totaling 840 kilometers have been built since 1973 under the Accelerated Rural Development Program. These truck roads have contributed not only to the development and utilization of mountain resources but also to the improvement of the livelihood of people in foothill areas.

1. 鄉民領取外援糧食，配合本身勞力興建產業道路。
   Distribution of food aid to local people participating in the road building work.
2. 興建中的產業道路。
   A forest road under construction.
3. 農復會前主任委員沈宗瀚及委員郝夫曼參加瑞中產業道路通車典禮。
   Former JCRR Chairman T. H. Shen and Commissioner Gerald H. Huffman inspecting a newly completed forest road.

3

農復會利用地熱建造的木材乾燥窯。
A dry kiln established by JCRR, which makes use of geothermal energy.

瑞竹林業生產合作社新建立的木竹材防腐廠。
The wood and bamboo treating plant of the Juichu Forest Production Cooperative.

推行竹木材乾燥防腐及加工

木材乾燥與防腐爲改進木材品質最基本的措施。臺灣木材乾燥工業始於民國四十三年，初期僅有政府經營的一、二座示範性乾燥窯，民間缺乏認識，以致外銷木製品品質不佳，時生紛擾。農復會每年舉辦木材乾燥訓練班，並派遣技術人員至各加工廠實地指導，成效良好；近年各地紛紛建立乾燥窯，且有專業木材乾燥窯出現。臺灣地區的乾燥窯現已增加到三百餘座，每年可處理木材八十萬立方公尺。

二十五年前，臺灣僅有一座簡易木材防腐槽，作業能量及防腐效果均低。歷年來會同林業試驗所及青果運銷合作社協助民間設立木材及竹材防腐廠，處理鐵路枕木、橋樑用材、果樹及香蕉支柱，以及菇舍用竹材等。目前具相當規模的防腐工廠已有七家，能量足敷竹木材防腐處理之需。

臺灣竹材資源豐富，但多年來竹材工業始終停滯於手工編織階段，耗費人力多而市場有限。經與林業試驗所及林務局合作，研究改變竹材加工基本型態，由手工生產進步爲機械製造，產品也由編織品及粗製品用具，發展爲精美的家具及建築材料，外銷市場潛力極大。

DEVELOPMENT OF WOOD DRYING, PRESERVATION AND PROCESSING

Timber drying and preservative treatment are fundamental to improving the wood quality. Timber drying was first started in Taiwan in 1954 with a few dry kilns established by the government for demonstration purposes; at that time most manufacturers engaged in the production of wooden articles for export were ignorant of the importance of this operation. Over the years, as a result of the promotive efforts made by JCRR, including the training of kiln operators and provision of technical assistance to woodworking factories, more than 300 dry kilns with an annual capacity of about 800,000 cubic meters have been established.

In 1953, there was only one simple wood treating unit in Taiwan; it was low in both capacity and efficiency. During the past years, JCRR has cooperated with the Taiwan Forestry Research Institute and the Taiwan Fruit Marketing Cooperative in helping the private sector set up wood and bamboo preservation plants to treat railway ties, structural materials, fruit tree and banana supports, etc. Today, there are seven medium-sized plants in operation, capable of meeting all the needs.

Taiwan abounds in bamboos. For long years the local bambooware industry remained in a rudimentary form, producing handicraft and simple articles for a limited market. Through research efforts jointly made by JCRR, the Taiwan Forestry Research Institute and the Taiwan Forestry Bureau, this industry has progressed to machine manufacturing of high-grade furniture and construction materials.

1. 竹材加工成品已普遍銷售國外。
   Finished bamboo products for export.
2. 設於農村加工區的中小型木竹加工廠。
   A bamboo processing plant in a rural industrial area.
3. 由於木材乾燥技術的普遍應用，木器家具已可大量外銷。
   Furniture for export, made of well-seasoned wood.

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3

水土保持與坡地開發

臺灣因受自然環境的影響，水土保持問題極爲嚴重，但坡地的開發利用也是必然的趨勢。農復會於民國四十年起，與臺灣省政府合作推行水土保持計畫，實施有關的訓練、示範及推廣工作。

臺灣省山地農牧局於五十年成立後，在各縣市設置水土保持股及工作處，普遍逕行示範及推廣，迄今已完成各項水土保持處理面積達一五三、〇〇〇公頃，發揮防止土壤冲蝕及促進土地合理利用的功效。

水土保持工作初期爲零星進行，五十四年起改以面積較大的區域爲單位，實施綜合水土保持及土地利用計畫。除規劃農場水土保持處理外，並有系統的興建農路、灌溉、排水等公共設施，以改善農場經營條件，發展現代化的坡地農業。現已完成一六〇餘區，興建或改善農路一、二六六公里、灌溉設施二三九處，農牧經營輔導面積達四一、〇〇〇公頃。

爲建立臺灣本身的水土保持技術標準，五十二年起加强有關試驗研究工作，經就平台堵段、山邊溝、覆蓋作物等的改良與利用，制訂了一套可配合坡地機械作業、省工經營的經濟有效水土保持方法體系，並據以完成現代化坡地農場規劃；聯合國糧農組織及若干國家都已參考採用。近年並開始就土壤冲蝕、土壤水分及土壤有機質等項目進行較深入的基本試驗研究。

實施水土保持處理，興建農路等公共設施，可促進土地合理利用。

Hillside ditches, farm roads and irrigation facilities contribute to proper slope land conservation and use.

Soil Conservation and Slope Land Development

Owing to unfavorable natural conditions, soil erosion is a serious problem in Taiwan. The situation is being aggravated by the growing need to develop and use slope lands for agricultural purposes. In 1951, JCRR began to sponsor soil conservation training, demonstration and extension projects in cooperation with the Taiwan Provincial Government. With the creation of the Mountain Agricultural Resources Development Bureau (MARDB) in 1961 and subsequent establishment of soil conservation field offices and working stations, the demonstration and extension work has been much intensified. To date, a total of 153,000 hectares have been treated with various conservation measures.

In the early years, soil conservation work was undertaken only sporadically. To promote modernization of slope land farm management, an integrated soil conservation and land use program has been carried on on a regional basis since 1965, involving the systematic construction of farm roads, irrigation and drainage facilities in addition to application of soil conservation practices. Up to the present, in 160 localities covered by the program, some 41,000 hectares of slope lands have been reclaimed for crop and livestock farming, with 1,266 kilometers of farm roads and 239 irrigation systems built or improved.

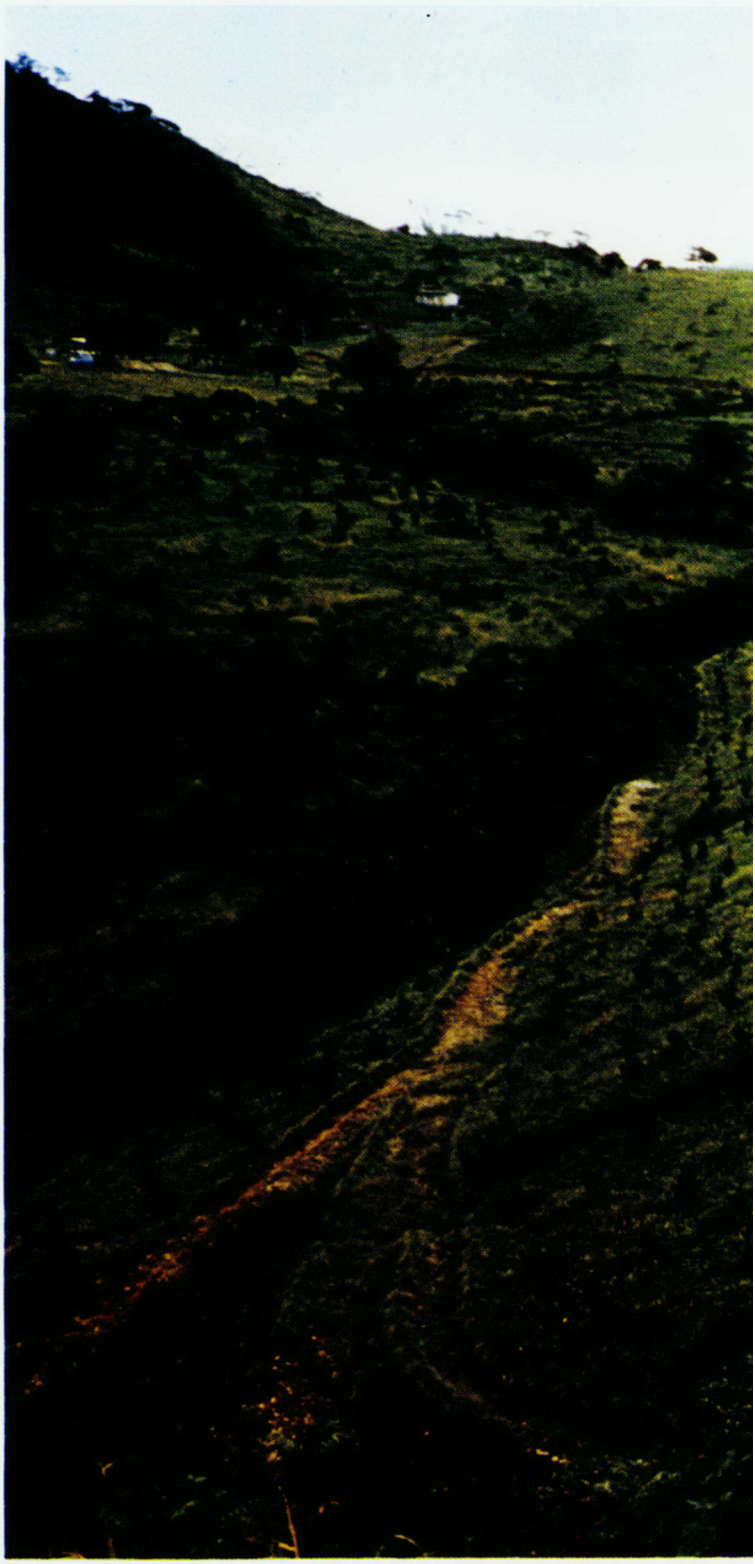
根據上述研究成果，五十三年刊行的「水土保持手册」已於年前修訂完成。

農復會於四十二年首倡霧社集水區治理計畫，此後協助林務局、農牧局等有關單位於五十年起先後完成全省十五個主要河川及水庫上游水土保持初步調查規劃，並在水庫及各重要集水區及野溪完成防砂壩、潛壩、丁壩、堤防護岸及排水溝等工程。至集水區試驗研究工作，經於五十三年開始推動，已完成十四個試驗集水區，主要研究項目包括森林水文觀測、崩塌及泥砂災害的調查與防止等。

臺灣的山坡地農場，因坡度陡峻而致耕作困難，勞動生產力偏低。農復會自六十年起，協助山地農牧局積極推行機械作業，構築水土保持設施並興建道路系統，同時發展適於臺灣坡地條件的農業機械及作業方法，以達成坡地農業作業機械化的目標。

運輸、施藥爲坡地農場主要的重勞動項目，經過十年來的研究改進，已研製完成一種動力三輪車，可兼供坡地運搬與噴藥之用；至無法興建農路的農場，則採用索道運輸。另初步完成可刈除坡地匍匐性覆蓋作物的刈草機。這些機具都已爲坡地農友廣泛採用。

農地水土保持在初期以平台階段爲主要措施。
Bench terracing — a major conservation practice employed in the early years.



現代化坡地果園在有效保育處理下，適宜機械作業。
Use of machines is possible in slope land orchards treated with proper conservation practices.

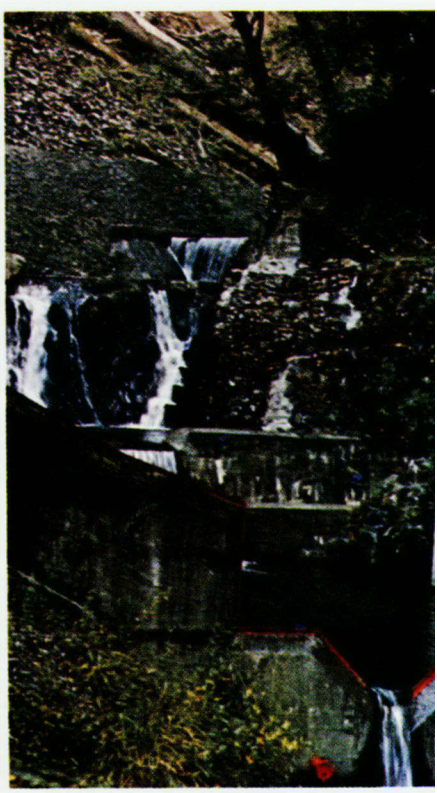
鳳山熱帶園藝試驗分所農地水土保持綜合試驗區一隅。

Soil conservation test plots at the Fengshan Tropical Horticultural Experiment Station.

坡地農業機械作業情形。
Use of power sprayer on slope land farm.

坡地濫墾嚴重破壞集水區水土資源。
Illegal cultivation of slope land is detrimental to water and soil resources.

興建攔砂壩可穩定河床，減少洪水及泥砂災害。
Check dams can stabilize the stream bed and reduce flood and sedimentation damage.



利用森林水文觀測設備收集溪流水質及水量基本資料。

A research program aimed at establishing technical standards for soil conservation measures has been in progress since 1963. By incorporating such improved practices as bench terracing, hillside ditching and cover cropping, an economical and effective soil conservation system suited to mechanized and labor-saving slope land farming has been developed. In recent years, more basic studies have been conducted on the physical properties of soil, erosive effects of rainfall, dynamics of overland flow, etc. On the basis of the research results obtained, the "Soil Conservation Handbook" published in 1964 has been revised.

The first watershed management project in Taiwan was initiated by JCRR in 1953. With JCRR financial and technical assistance, the Taiwan Forestry Bureau and the Mountain Agricultural Resources Development Bureau have since 1961 completed preliminary soil conservation planning for the upstream areas of 15 rivers and reservoirs, and constructed such protection structures as check dams, submerged dams, spur dikes, levees and drainage channels in major watersheds and on wild creeks. Under a watershed research program started in 1964, 15 experimental watersheds have been established to collect basis hydrologic data and study the relationships between watershed characteristics and changes in environmental factors caused by logging, reforestation, land reclamation, etc. Studies have also been made on the control of landslides and sedimentation.

Labor productivity on slope land farms is low due to difficulties caused by steep slopes of the farms.

Since 1971, JCRR has assisted MARDB in promoting the use of machines in constructing soil conservation structures and farm roads. In the meantime, efforts have been made to develop farm machines adaptable to Taiwan's slope land conditions and improve farm facilities for achieving mechanization of slope land farming.

Transportation and pesticide spraying are the two most labor-demanding operations on slope land farms. A motor-cart and a pipeline spraying system have been developed to serve these purposes. Cableways are now used for the transport of farm produce and supplies in places where it is impossible to build roads. A rotary-type mower has been developed for cutting tangled Pangola grass on slope land.

Recording instruments are used to measure the stream-flow, rainfall and other parameters of the hydrologic cycle.

利用機械整理坡面及構築山邊溝。
Land levelling and hillside ditching by means of machines.

畜牧生產

臺灣地狹人稠，以飼養豬、鷄爲主的畜牧事業在整個農業中佔有甚重要的地位，主要養豬地區遍及中南部。民國四十九年全年豬隻屠宰頭數僅爲二、一三九、〇〇〇頭，由於國民生活水準提高及人口急速成長，六十六年豬隻屠宰頭數增至六、一〇〇、〇〇〇頭，較四十九年增加達二・九倍。

本地豬由於生長性能較差，農民已極少飼養。目前的豬種絕大多數爲進口的藍瑞斯、約克夏、杜洛克及以三品種雜交的雜種豬。經農復會多年協助推動試驗與示範，農民多已採用人工授精方法繁殖豬隻。

臺灣養豬事業的發展全賴有效的豬隻疾病防治。四十年代初期由於豬瘟及豬丹毒猖獗，豬隻死亡率高達八%。經全力協助實施防疫注射及檢疫工作，重要豬隻疾病多已撲滅。六十三年豬瘟注射率高達一四五%，豬隻死亡率則降低至〇・〇二六%。

這些措施奠定了今天蓬勃的養豬事業的基礎，同時也帶動了飼料事業的勃興。

農復會爲提高國民營養水準及節省外滙支出，近年在加速農建計畫項下加强輔導農民飼養乳牛。到民國六十七年四月，臺灣全省共已設置二十個乳牛專業區，飼養乳牛八千餘頭。此外，並鼓勵農民使用農作副產物從事副業性養牛，充分利用農業資源。

爲改進臺灣的乳牛牛羣，農復會近年曾協助有關單位自澳洲、紐西蘭及美國引進優良乳牛，並由美國進口冷凍精液，實施人工授精。

在家禽方面，目前蛋鷄與肉鷄多已進入企業化生產階段，農家養鷄所佔地位已屬次要。但養鴨仍爲農村中的一項重要副業。

臺灣人口的不斷增殖與經濟的繼續成長，使國民對肉類、鷄蛋、牛乳的需求日見增加。由於豬、鷄生產所需土地極少，而牛隻則可飼養於山坡地，現階段農業各部門中，畜牧增產將爲必然的趨勢。

豬隻生產

臺灣光復初期，農民所飼養的毛豬全爲生長慢、肥油多的本地種，如桃園種及頂雙溪種。甘藷和甘藷蔓是主要的養豬飼料，另加配少量大豆餅。由於飼料的不平衡，飼養一頭豬需時一年左右，飼料利用效率僅及八比一。當時豬瘟猖獗，死亡率高達總飼養頭數的八%以上；養豬危險性既大，規模又小。

爲促進農村養豬事業的發展，農復會在四十年代引進盤克夏種豬，並推動盤克夏種公豬與本地種母豬雜交，以改良肉豬的品質。一方面又加强對豬瘟的控制，支持淡水獸疫血清製造所研製成功結晶紫豬瘟疫苗，並進行示範。隨後又引進兔化豬瘟毒株，製成安全性及免疫性均高的兔化豬瘟疫苗，經於屏東實地試用成功，繼而在臺灣全省推廣。

我國目前用於兔化豬瘟疫苗製造的種毒株，係經過九年長時期累代通過臺灣兔八百餘代，再經一連串試驗，證實確具有高度安全性及免疫性。五十四年臺灣豬瘟發生率降低至〇・〇二%，應歸功於兔化疫苗的研製成功。

此種兔化疫苗最初爲水劑形式，經於四十七年再協助建立冷凍乾燥實驗室，生產易於保存的乾燥疫苗，大量供應全省豬瘟預防所需。五十九年，兔化豬瘟毒試管內滴定法研究成功，對疫苗的製造與檢定貢獻甚大。

民國五十年代以後，臺糖公司發展三品種雜交豬成功；同時在美援四八〇公法項下也開始進口玉米，養豬事業的發展已具備較佳的條件。爲配合此一新形勢，農復會曾在屏東縣推行一項大規模綜合性養豬計畫，不僅在技術上革新了古老的養豬方式，且配合資金的貸放，將農村養豬帶進了一個新境界。

在綜合性養豬計畫項下，首先須解決平衡飼料供應的問題。當時民間尚無飼料廠，農復會在屏東縣農會設立了一家小型飼料廠，生產「半完成飼料」，以實物貸放的方式供應農民，配合農家自備的甘藷簽養豬，大幅提高了養豬的效率。

其次是品種的改良。農復會自國外進口了約克夏、藍瑞斯與杜洛克種豬，分別與本地種與盤克夏所產雜交母豬交配，生產三品種肉豬。因公豬有限，採用人工授精方法加速豬種的改良。

採取兔隻脾臟及淋巴腺以供製造兔化豬瘟疫苗。
Removal of spleens and lymph nodes of rabbits for production of lapinized hog cholera vaccine.

Livestock Production

LIVESTOCK PRODUCTION

Hog raising, a popular farm undertaking in Taiwan, has an important place in the island's animal industry. In 1960 the number of hogs slaughtered was 2,139,000 head, and it soared to 6,100,000 head in 1977, a 2.9-time rise in 17 years.

Farmers have long abandoned the native breeds in favor of better performing Landrace, Yorkshire, Duroc and their three-way crosses. Through years of experiments and demonstrations, artificial insemination for hogs has now been generally accepted by the farmers.

Effective control of infectious diseases has been a main factor contributing to the rapid development of the hog industry. Hog cholera and erysipelas raged in the 1950's, with a motality as high as 8.3%. Extensive vaccination and strict quarantine soon brought these and other major diseases under control. In 1974, the rate of vaccination against hog cholera reached 145.01%, and mortality dropped to 0.026%. This has paved the way for large-scale hog farming, which has in turn promoted the development of a modern feed industry.

In order to raise the nutrition level of the people, the farmers have in recent years been encouraged to engage in dairy farming. Up to April 1978, a total of 20 specialized dairy villages had been set up for this purpose. At the same time, incentives have been provided for farmers to raise beef cattle, mainly as a sideline, with the use of agricultural by-products.

Under a dairy herd improvement program, JCRR has assisted in importing thousands of Australian, New Zealand and American dairy cattle in the last few years. Frozen semen has also been procured from the United States for artificial insemination of dairy cattle.

Poultry are now produced mostly on a large scale by commercial farms. Duck raising remains an important farm sideline.

Steady population increase and rapid economic growth have pushed up the demand for meat, eggs, and milk. Since hog and chicken raising does not require much land space and cattle can be pastured on slope lands, further increases in livestock production are expected.

SWINE PRODUCTION

In the immediate postwar years, native pigs, which are fatty and grow slowly, dominated Taiwan's swine herds. Fed chiefly on sweet potato tubers and vines, these pigs had a low feed conversion ratio of 8:1, and it took more than a year for them to reach market weight. This coupled with a high mortality due to hog cholera made swine raising hardly profitable.

In 1950, JCRR began to import Berkshire pigs from the United States for cross breeding with native sows to produce hybrids. Meantime, hog cholera was brought under control with the use of a potent and safe vaccine produced in 1950. In 1952, JCRR introduced a lapinized hog cholera virus from the Philippines. Subsequently, a highly immunogenic and safe lapinized vaccine was developed and extended island-wide.

農復會前畜牧組組長亨德視察農家猪舍。旁立者爲該組前技正李崇道。

James A. Hunter, a former chief of JCRR's Animal Industry Division, inspecting a hog farm in the company of Dr. Robert C. T. Lee, then a specialist.

甘藷簽配以「半完全飼料」，大幅提高養猪效率。

Use of concentrate feed mixed with sweet potato slices increases the efficiency of hog raising.

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綜合性養豬計畫並推行家畜保險制度，農民僅須交付保險費三〇元，即可享受家畜疾病免費治療與死亡賠償的權利，充分保障養豬的安全。

至於共同運銷，則是將所生產的毛豬交由農會負責運銷，在售豬所得貨款中扣除貸款後將淨利交與農民。貸款收回率幾達百分之百。

由於養豬規模逐漸擴大，農家所飼家畜的排泄物漸有過剩現象，必須加以適當的處理。農復會在綜合性養豬計畫項下開始推廣一種小型沼氣池，利用豬糞酸酵產生沼氣。以後繼續改良，推廣戶數最高時曾達八千戶，在國際間甚受重視。

綜合性養豬計畫在屏東推行成功後，繼續在其他地區推廣，五十年代後期已遍及全省。農復會協助十四個農會分別設立飼料廠，並擴大辦理農貸，甚多虧損農會因辦理養豬貸款及共同運銷的合理收入，而得以復甦。

由於臺灣經濟繁榮，外滙收入增加，政府在農復會建議下開放玉米及大豆自由進口，農會飼料廠利用廉價原料生產完全飼料供應農民養豬。甘藷養豬的方式開始沒落。

養豬事業迅速而普遍的發展，新設的飼料廠如雨後春筍，高聳的圓筒倉庫更構成了農村新的風景線。

進入六十年代後，民間飼料工業與養豬事業發展更速。農復會一方面配合政府加速農村發展政策，選擇偏僻的濱海與山坡地區爲推廣養豬的重點，分別建立農牧、漁牧專業區，以改善貧窮地區農民的生活。另一方面協助臺灣大學發展小型自動化飼料機器，並與有關機關合作舉辦飼料講習班，引進飼料散裝車示範散裝操作，協助畜產試驗所成立飼料化驗中心，加强品管工作。

1. 猪瘟預防注射。
   Vaccination against hog cholera.
2. 三品種雜交猪。
   Three-way-cross pigs.
3. 新型紅泥沼氣袋。
   Plastic-bag methane generator.

The lapinized hog cholera virus now employed in Taiwan for vaccine production has been serial-passaged through native rabbits for more than 800 generations and is referred to abroad as the "China strain." Experiments have shown that this virus is highly safe and can produce solid immunity in pigs. The hog cholera incidence dropped to 0.02% in 1965 because of the use of lapinized vaccine.

In the beginning, the lapinized vaccine was applied in a wet form. In 1958, a lyophilization laboratory was established to produce freeze-dried lapinized vaccine for general use. Two in-vitro methods for titration of the lapinized hog cholera virus were developed in 1970, which have been a great help in the production and assay of the vaccine.

Three-way-cross pigs were first produced by the Taiwan Sugar Corporation in 1957. This and the import of corn under U.S. PL480 helped lay a firm foundation for the development of a modern swine industry in Taiwan. In 1962, JCRR initiated an integrated swine production program in Pingtung, under which farmers were assisted in getting better swine breeds and feed as well as low-interest loans, thereby bringing rural swine raising into a new phase.

To meet the feed requirement of the integrated swine program, JCRR assisted in building a small feedmill at the Pingtung County Farmers' Association. With the use of concentrate feed supplied by the mill on a loan basis, supplemented with sweet potato chips, the farmers were able to improve the efficiency of pig raising considerably.

Next came breed improvement, JCRR imported Yorkshire, Landrace and Duroc boars from the U.S. and had them mated with "Berkshire x native" crossbred sows to produce three-way crosses. Meantime, artificial insemination was extended to speed up the genetic improvement of swine.

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Under the integrated program, a livestock insurance plan was launched by the farmers' associations concerned. By paying a premium of NT$30 per pig, farmers got free treatments for their diseased animals and cash compensations in the event of deaths.

Cooperative marketing was another measure taken to promote integrated swine production. Farmers sold their hogs through the local farmers' association and were paid the full price less the amount of loans they received from the FA. According to a survey, the loan repayment rate had been almost 100 percent.

With the expansion of the scale of swine farming, the disposal of animal wastes became a problem. Under the integrated swine program, JCRR developed a small methane generator which produced methane gas through the fermentation of pig manure. After improvements were made on it, this generator was adopted by as many as 8,000 farm families. Recently, a new type of methane generator made of "red-mud plastic" in the form of a bag has been developed by the Union Industrial Research Laboratories with JCRR assistance. It costs much less and can be made as large as required.

The integrated swine program was extended island-wide in the 1960's following its successful implementation in Pingtung. JCRR assisted 14 farmers' associations in establishing their feedmills and made loans to the participating farmers through the FAs. Many a farmers' association which used to be in debt began to make money from their cooperative marketing and credit operations.

Steady economic growth and increase of foreign exchange earnings prompted the government to liberalize imports of corn and soybeans. Using the imported grains, the feedmills of farmers' associations began to manufacture complete rations for use by hog farmers in place of sweet potatoes.

In the early 1970's while the hog and feed industries continued to grow at a fast pace, JCRR turned its attention to helping farmers in less developed regions to take up hog raising as a means of improving their livelihood. Under the Accelerated Rural Development Program, which was started in 1973, a number of integrated swine-crop and swine-fish farming villages were set up in remote coastal and slope land areas. JCRR also assisted the National Taiwan University in developing an automatic feed mixing machine, conducted feed seminars, demonstrated bulk feed handling, and helped establish a feed analysis center at the Provincial Livestock Research Institute.

五十年代，農復會鑑於人工屠宰方式落伍且有礙衛生，一方面推動屠宰衛生管理人才的訓練，一方面協助高雄市政府建造臺灣第一座新型屠宰場，以後北部亦由民間投資建立新型屠宰場。近年來又會同有關機關積極推動在各地設置家畜市場與新型屠宰場合併經營的肉品市場，逐步改善國內食肉衛生條件。

五十七年，臺灣第一家新型肉品加工廠在農復會協助下興建完成，產製冷凍猪肉及洋式香腸外銷日本，刺激了國內肉品加工業的興起。目前肉品加工廠已增至二十餘家，每年處理毛猪近百萬頭。爲增進國民食肉安全及開拓歐美市場，經先後協助有關機關制訂肉品加工技術、設備與衛生管理等法規，進行肉品品質與添加物殘留量的分析研究，及修訂肉品檢驗準則。現已有一家加工廠的屠宰、加工設備獲得美國農業部的認可，不久後我國肉製品特別是中式食品可望展開對美輸出。

目前臺灣養猪事業在量的方面已接近飽和，但在質的方面，尚待進一步的改良。農復會目前的工作重點如下：

一、繼續協助臺灣省畜產試驗所加强雜種母猪的繁殖，供應養猪農戶所需藍瑞斯與約克夏雜交優良小母猪。

二、擴大建立藍瑞斯、約克夏、杜洛克及漢布夏等四個品種的核心猪羣，以供畜試所所屬六處雜種母猪繁殖場及民營種猪場的需要。

三、應用電腦進行種猪選育資料處理工作。

四、擴大種公猪檢定站作業，以提高猪隻生長性能。

五、改進家畜人工授精技術，使用經種公猪檢定站檢定合格的公猪配種，以新鮮精液供應鄉鎮地區的人工授精站。

六、加强猪瘟研究，提高兔化疫苗品質，研究組織培養疫苗，並研究初生小猪的免疫問題，以改善傳統免疫方式。

七、支持有關機構加强對猪水疱病、假性狂犬病、猪傳染性胃腸炎、猪流行性肺炎等疾病的防治。

八、加强沼氣研究，以提高使用效率及擴大用途。

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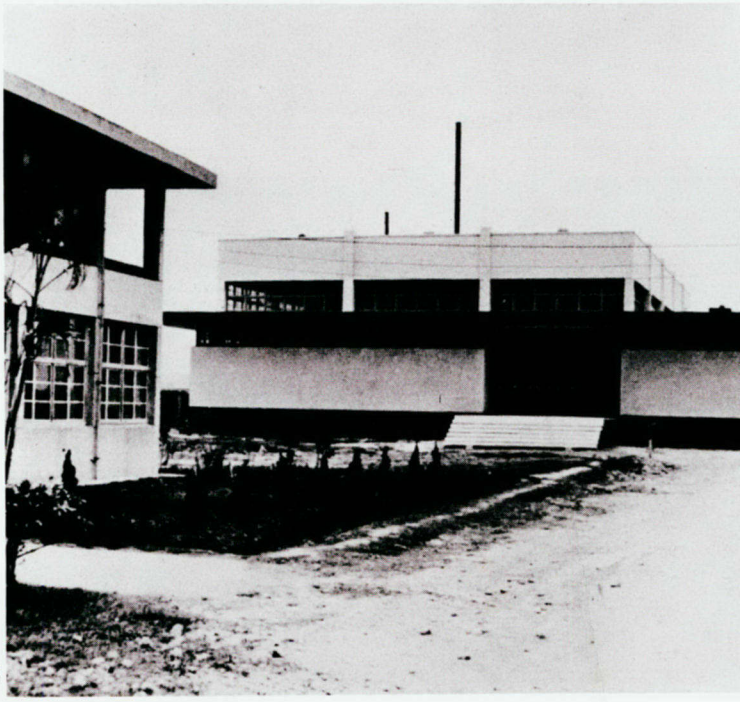
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1. 由於養猪事業的發達，各地紛紛建立飼料廠。
A newly established feedmill.

2. 肉品加工。
Inside view of a meat processing plant.

3. 高雄市新型屠宰場。
The modern slaughterhouse at Kaohsiung.

To improve the slaughter of hogs, JCRR in the 1960's initiated a series of training courses for meat inspectors and veterinarians, and assisted the Kaohsiung City Government in constructing a modern slaughterhouse, the first of its kind in Taiwan. Later, another abattoir was built in northern Taiwan by a group of overseas Chinese from the U.S. In resent years, with the support of JCRR and other agencies concerned, modern meat markets complete with livestock auction and slaughtering facilities have been established in other localities.

The first commercial meat packing plant was established in Pingtung in 1968 with JCRR assistance. Producing frozen pork cuts and Western-style pork products for export, this plant spearheaded the development of Taiwan's meat processing industry. At present, there are over 20 such plants, which handle about one million hogs a year. To promote meat hygiene in the interests of both consumers and exports, JCRR has in the last few years assisted related government agencies in setting technical and sanitary standards for processing plants, conducting studies on meat quality and use of additives, and revising meat inspection regulations. A local meat packing plant has recently obtained a USDA license to export its products to the U.S. It is expected that Chinese-style foods will appear in the American market soon.

Currently, the JCRR hog improvement program lays emphasis on:

1. Supply of hybrid gilts of Landrace and Yorkshire crosses to hog farmers.
2. Expansion of the nucleus herds of Landrace, Yorkshire, Duroc and Hampshire to ensure a steady supply of hybrid sows for the six breeding animal propagation stations of the Provincial Livestock Research Institute (PLRI) and private breeder farms.
3. Computerization of the selection of breeder pigs.
4. Strengthening of work of boar testing stations to improve swine performance.
5. Improvement of artificial insemination techniques.
6. Strengthening of hog cholera research to improve the quality of lapinized vaccine, develop tissue culture vaccines and study immunization of new-born pigs.
7. Intensification of control of swine vesicular disease, pseudorabies, transmissible gastroenteritis in pigs and swine enzootic pneumonia.
8. Conduct of advanced research to improve methane generation and utilization.

採取種豬精液供人工授精之用。
Collection of semen for use in artificial insemination.

漁牧綜合經營。
Hog raising combined with fish farming.

牛的生產

臺灣光復初期，一般農家所飼養的牛隻多爲水牛或由本地黃牛與印度牛雜交育成的改良黃牛，乳牛的飼養僅見於都市附近的少數牧場。

民國五十年代，牛隻生產的重心在改良本地牛的產肉及產乳性能，農復會先後協助進口康古勒牛及摩拉水牛，分別改進黃牛的役力與本地水牛的泌乳能力，同時選擇優良種公牛與本地母黃牛配種。爲推廣在農村飼養乳牛，五十年首先在彰化倡設酪農示範村，至五十年代末期，推廣地區已擴展至彰化以北地區。

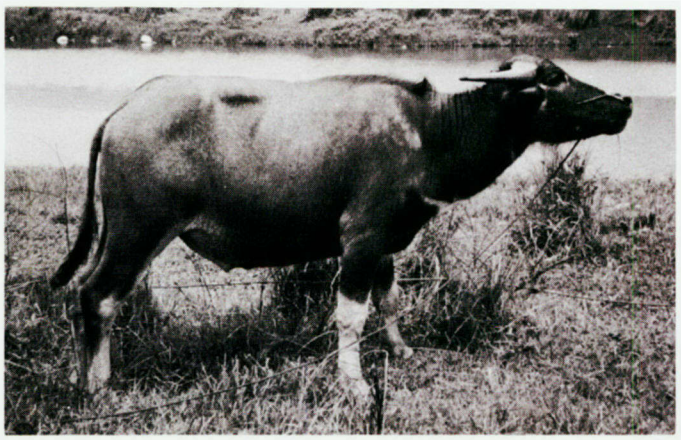
爲提高農林邊際土地的利用，發展草原式畜牧事業，四十八年協助楊梅地區農民二十戶在坡地種植牧草，飼養乳牛，成效良好，每頭泌乳牛可獲相當於耕種山田五分的收益。以後陸續在苗栗將軍山、彰化銀行山等地推廣。坡地畜牧的順利推動，主要應歸功於熱帶牧草盤固草及狼尾草的試種成功。五十四年至五十九年，在聯合國特別基金項下成立「臺灣山坡地畜牧發展計畫」，由畜產試驗所進行研究發展及訓練工作，更强化了坡地養牛事業的技術基礎。

牛瘟爲一種惡性傳染病，對養牛事業爲害甚大。經配合農林廳等機關全力防治，三十九年已予澈底根除。歷年來並協助進行乳牛結核病及布氏桿菌病的防除，已有相當成效。

爲充實家畜疾病診斷及防疫設施，四十五年起逐年協助各縣市成立家畜疾病防治所。此外並輔導農會辦理家畜保險，以減輕疾病損失。目前承保農會已達二六四個。

另爲嚴防國外惡性傳染病入侵，保護國內家畜禽的生產，五十二年起陸續協助有關機關在各港口設置動物檢疫所，六十三年並支助建立高雄港大動物隔離檢疫所。

六十年代，農復會配合政府加速農村發展政策，選擇適當地區設置酪農專業區，以提高生乳供應量。同時爲便利生乳的集運與處理，一方面在各專業區內設立集乳站，一方面協助臺灣省農會成立鮮乳加工廠生產保久鮮乳。



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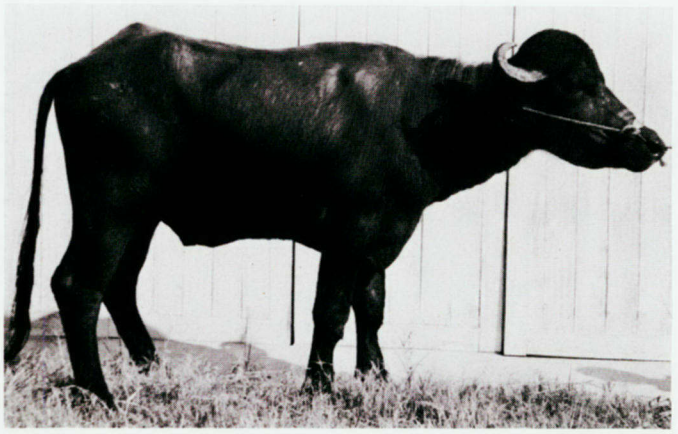

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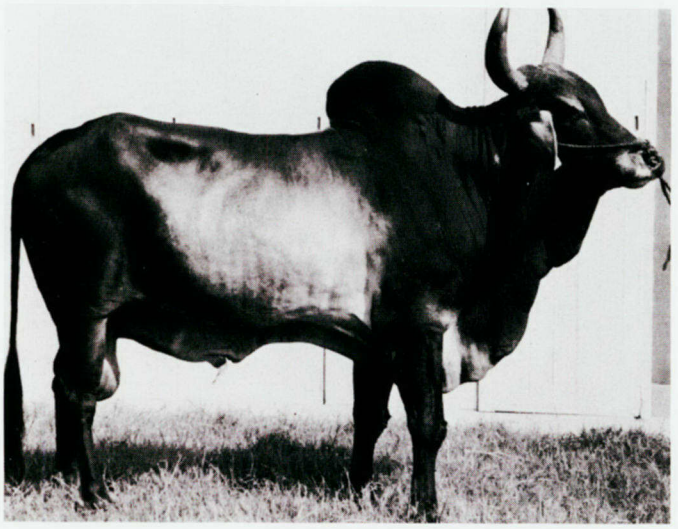

1. 台灣水牛源自大陸，耐粗放飼養，適應本省環境。
   All water buffalos in Taiwan originate in mainland China. They adapt well under rough feeding and management conditions.
2. 台灣黃牛與印度辛地牛雜交所產的改良黃牛。
   An F_1 crossbred produced by mating Indian Zebu-Sindhi bull with native yellow cow.
3. 印度康古勒牛於五十年代引進，與本地黃牛雜交以增進其役力與耐熱性。
   Kankrej cattle from India were used in a breeding program to improve the draft power and heat tolerance of native yellow cattle.

農復會前畜牧組組長呂豪華及其協助建立的盤固草牧草地。

Howard W. Ream, a former chief of JCRR's Animal Industry Division, and a pasture of pangola which he helped establish.

CATTLE PRODUCTION

In the early postwar period, the cattle raised by farmers in Taiwan were mostly water buffalos and crossbreds of native yellow cows and Indian zebus. There were only a few small dairy farms scattered in areas near cities.

The cattle program of the 1960's put stress on improving the beef quality and milk productivity of native cattle. JCRR imported Kankrej cattle (Indian zebu) and Murrah buffalos to improve the draft power of native yellow cattle and to increase the milking ability of water buffalos. Meantime, superior bulls were selected for crossing with the native yellow cows. A few demonstration dairy villages were established in Changhua county in 1961. By the end of 1970, dairy farming had been extended to areas north of Changhua.

To make use of marginal slope lands for development of pastoral agriculture, JCRR initiated a dairy farming program at Yangmei in 1959 for demonstration purposes. Starting with

坡地酪農專業區內每戶酪農最初飼養乳牛六頭。

One of the dairy farms set up under a JCRR-supported slope land dairy development project.

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20 farms, this program showed that the income from a milk cow was comparable with that from 0.5 hectare of upland crop farming. Subsequently, more dairy farms were established at the Chiangchun Mountain in Miaoli and the Bank Mountain in Changhua.

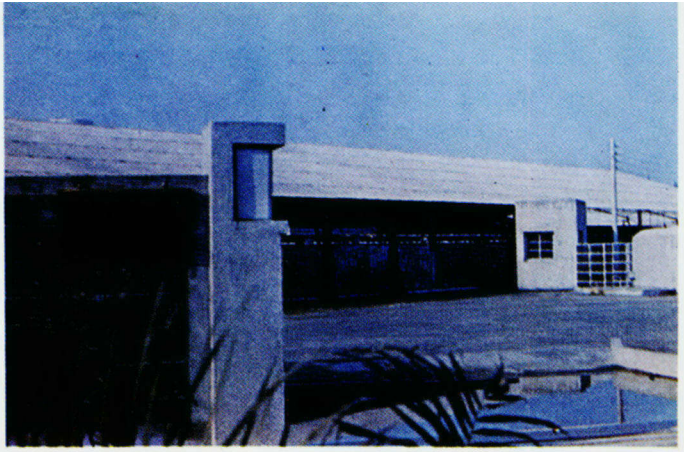
The success of dairy farming on slope lands was attributable to the introduction of two tropical grass species, napier and pangola. Under the "Slope Land Livestock Development Program" supported by UNDP, research and training in slope land cattle farming were conducted at the PLRI in 1967-1970 to strengthen slope land pasture management.

Rinderpest, a deadly infectious disease, once posed a serious threat to cattle production in Taiwan. Through the joint efforts of JCRR and other agencies concerned, the disease was eradicated in 1950. Over the years, bovine tuberculosis and brucellosis have also been brought under control.

Beginning in 1956, JCRR assisted county/city governments in establishing livestock disease control centers (LDCCs) to strengthen livestock disease diagnosis and treatment. Meantime, farmers' associations were urged to undertake livestock insurance to redue farmers' loss. So far, 264 FAs have joined in the livestock insurance program.

In order to prevent exotic diseases from invading Taiwan, JCRR has since 1963 cooperated with the agencies concerned in setting up animal quarantine stations at major ports, including one for large animals constructed at Kaohsiung Harbor in 1974.

Under the Accelerated Rural Development Program, specialized dairy farming villages with milk collecting stations have been established in the past several years to increase the supply of raw milk. The Provincial Farmers' Association has also set up a milk bottling plant with JCRR assistance.



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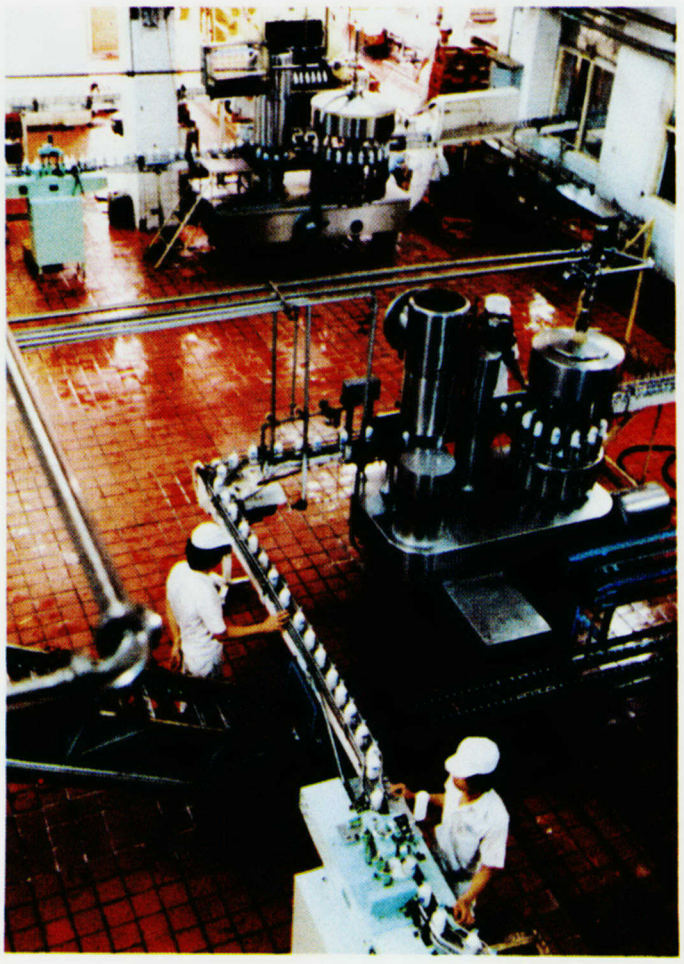

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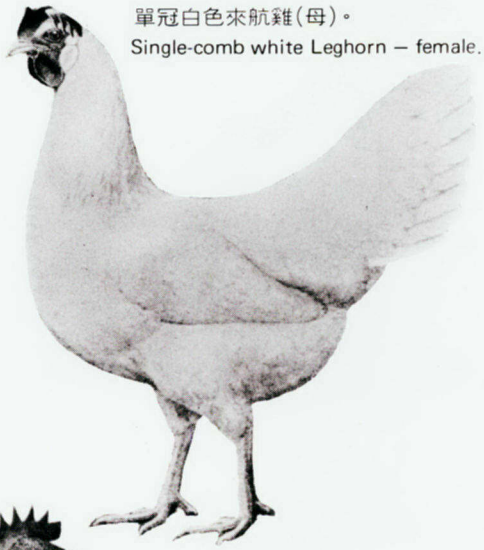
1. 利用機械搾乳。
   A milking machine at work.
2. 經皮內反應檢查確定的陽性牛隻均予撲殺，以杜絕乳牛結核病的蔓延。
   To prevent the spread of bovine tuberculosis, all dairy cows found to be positive reactors by intradermal test are slaughtered.
3. 牛瘟預防注射。
   Innoculation against rinderpest.
4. 高雄大動物檢疫中心。
   The qurantine station for large animals at Kaohsiung.
5. 屏東縣家畜疾病防治所。
   The Pingtung County Livestock Disease Control Center.
6. 台灣省農會彰化鮮乳加工廠內景。
   Inside view of the PFA milk bottling plant at Changhua.



單冠白色來航雞(母)。
Single-comb white Leghorn – female.

橫斑蘆花雞(公)。
Barred Plymouth Rock – male.

紐罕西雞(公)。
New Hampshire – male.

家禽

鷄

臺灣在光復初期，所有鷄隻均爲所謂的「土鷄」。鷄肉價格昂貴，鷄蛋被一般人目爲補品。食用蛋類則以鴨蛋爲主。由於鷄瘟猖獗，整個地區鷄隻死亡殆盡的情形時有所聞。首先在臺灣進行種鷄改良工作的是農復會畜牧組第一任組長亨德先生。他親攜洛島紅及蘆花公鷄至各地與農民交換土公鷄，將洋鷄具有的體型大及生長快的特性滲入土鷄血統中。此項計畫在屏東縣實施，甚爲成功。

農復會在四十年代先後進口多批種鷄，包括著名的來航鷄、洛島紅、蘆花鷄、紐漢西等，爲正當發軔時期的養鷄事業供應所需的優良種鷄。

由農復會派往美國實習的草根大使張昆煜在西螺開設張養鷄場，爲臺灣現代化養鷄開創了新局面。此種籠飼蛋鷄的生產方法一直沿用至今。農復會在大林、歸仁、路竹地區所進行的蛋鷄生產示範，以及以這些地區爲骨幹而由臺灣省農會主持的鷄蛋共同運銷、飼料供應等計畫，更刺激了民間業者在各地普遍建立飼料製造工廠。

臺灣地區鷄瘟一度猖獗，鷄隻死亡甚多。新城病疫苗的製造、白痢病的檢查等工作，農復會都曾協助推行。

農復會在五十年代初期推行綜合性養鷄計畫，由農會負責供應飼料及養鷄器材，生產的鷄隻及鷄蛋則透過共同運銷系統銷往臺北等大消費市場。爲配合共同運銷，並設計一種活動蛋箱及由國外進口的蛋盤。在肉鷄共同運銷方面，大肚鄉農會設置的半自動式衞生宰鷄場，促使鷄販及家禽業界建造大型家禽屠宰場。

六十年代，民間企業性養鷄開始蓬勃發展，農復會對養鷄事業的技術及經濟支援逐漸減少。現僅在技術及政策上提供咨詢。

1. 早年的蛋雞飼養(四十年代後期)。
   Layer management in the 1950's.
2. 早年的蛋雞飼養(五十年代初期)。
   Layer management in the early 1960's.

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POULTRY PRODUCTION

Chickens

In the late 1940's, all chickens in Taiwan were of native breeds, and their price was prohibitively high. Fowl pest often decimated the chicken population.

The first attempt at chicken improvement was made by James A. Hunter, a former chief of JCRR's Animal Industry Division. He imported roosters of Rhode Island Red and Barred Plymouth Rock in the hope that their superior genetic characteristics would mingle with those of the natives. Because of his untiring efforts, the work was successfully carried out in the Pingtung area.

In the 1950's, JCRR introduced from the U.S. such exotic breeds as Leghorn, Rhode Island Red, Barred Plymouth Rock and New Hampshire to provide breeder birds for the incipient poultry industry of Taiwan.

K. Y. Chang, a 4-H'er who received practical training in the U.S. as an IFYE delegate, opened a poultry farm at Hsilo upon his return. This farm pioneered commercialized chicken production on the island. The cage operation he devised is still popular today. The demonstrations on layer production conducted by JCRR at Talin, Kueijen and Luchu, and the joint egg marketing and feed supply activities carried out by PFA eventually led to the mushrooming of privately operated feedmills and poultry farms.

Fowl pest once caused widespread damage to Taiwan's chicken farms. JCRR was actively involved in the production of vaccines and bacterins against this disease and in the pullorum testing work.

In the early 1960's, JCRR initiated an integrated poultry production program, under which the farmers' associations supplied feed and other requisites to farmers and the latter had their chickens and eggs sold through the FA cooperative marketing system. Meantime, JCRR developed a collapsible case for egg transportation and set up a semi-automatic poultry slaughterhouse at the Tatu FA, which induced people in the poultry business to establish a large automatic poultry processing plant.

With commercialized poultry raising well established, JCRR began to phase out its financial and technical assistance to this industry in the early 1970's. At present, JCRR provides only advisory services on related technical and policy matters.

種雞舍內部。
Inside view of a breeder house for broilers.

1. 新型種雞舍(近景)及蛋雞舍(遠景)。
Outside view of a breeder house (right) and a laying house (left).

2. 雞白痢病檢查。
Pullorium disease testing.

鴨

養鴨在臺灣是一種傳統性的家禽事業，數百年來以菜鴨生蛋供爲食用蛋類的主要來源。公的正番鴨與母菜鴨交配後，其一代雜種的土番鴨作爲肉用家禽。

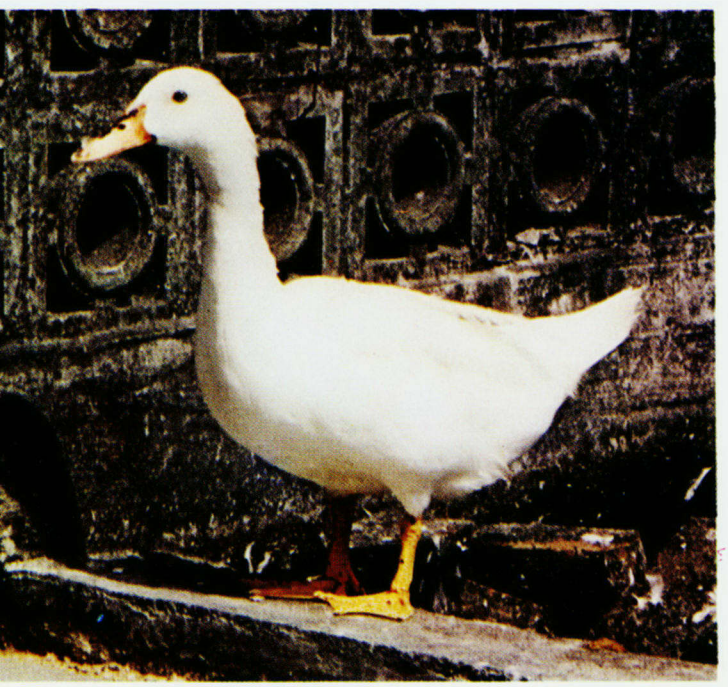
臺灣的養鴨業分工極細，有孵化小鴨的坑房，有養蛋鴨、養土番鴨、養種鴨的專業農戶，更有不少副業性的甚至趣味性的養鴨農家。小鴨販、蛋販、肉鴨販與集散地的鴨蛋行、肉鴨行等，構成運銷的通路。業者多屬農民，墨守成規，甚少求取改良。

民國五十年代，農復會鑑於世界各國甚少注重養鴨科學，而養鴨在我國則爲重要家禽事業，開始資助民間進行養鴨試驗及選種工作。並協助臺北區農業改良場設立養鴨研究中心，該中心於六十年遷至宜蘭縣五結鄉現址。

養鴨中心最顯著的成績是育成白色土番鴨，推廣後甚受農民歡迎；由於它的價值較原有褐色土番鴨爲高，每年農民可增加收益約兩億元。

養鴨中心除育成白色土番鴨外，尚在進行有關育種及營養方面的研究問題，將在短期內訂定養鴨營養標準。

養鴨研究中心全景。 Bird's-eye view of the Duck Research Center.



理想的白色土番鴨外貌。
A white mule duck of the ideal type.

白色土番鴨的育成。
Rearing of white mule ducks on a farm.

Ducks

Duck raising is a traditional farm sideline in Taiwan. For centuries, duck eggs have been the main table eggs for the Chinese people. The mule duck, a cross between Muscovy drake and native hen, is raised for meat.

The duck industry of Taiwan comprises highly specialized egg hatching, layer duck farming, meat duck raising, duckling peddling, etc. Other related operations include meat and egg processing, duck feather processing, and export of ducklings and feathers.

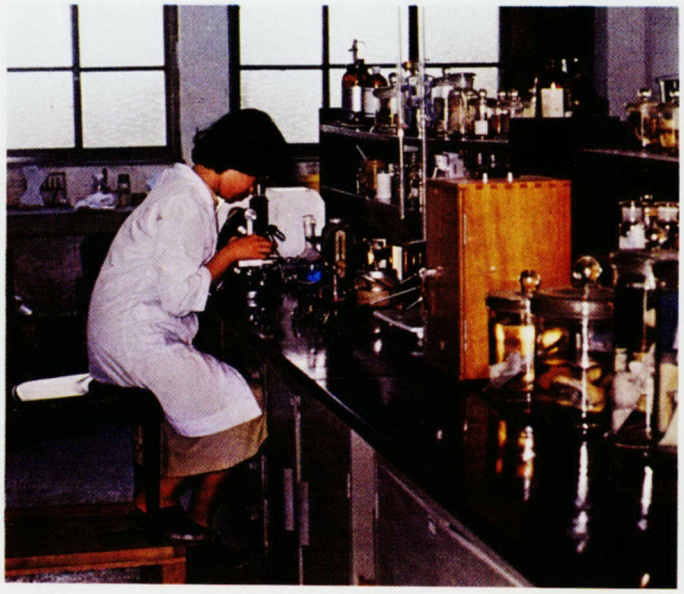
With JCRR financial assistance, a Duck Research Center was established in Ilan in 1968 mainly for research in duck farming and for promotion of the duck industry.

The most spectacular achievement of the center is the successful breeding of a new strain of inter-generic hybrid between Muscovy drake and Tsaiya duck or mule duck. Liked by both consumers and duck farmers, this white-plumaged bird can fetch a price about NT$1 per catty higher than the ordinary duck.

At present, the center is trying to establish nutritional standards for different duck species.

白色土番鴨的肥育。
White mule ducks at the finishing stage.

養鴨研究中心實驗室。
The new laboratory of the Duck Research Center.



傳統式孵鴨方法。
Traditional duck hatching.

漁業生產與技術改良

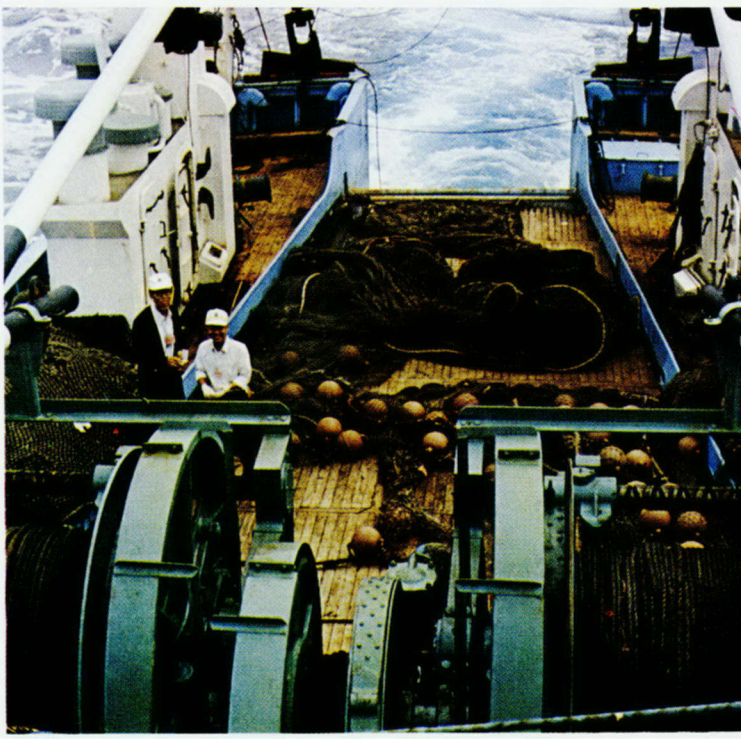
臺灣擁有優越的漁業環境及人力資源，漁業發展甚具潛力。三十年來，經政府推動及農復會輔導，加以業者與全體漁民的共同努力，漁產量的成長率平均每年在一〇%以上。民國六十六年，臺灣總漁產量超過八十五萬公噸，名列世界第二十位；漁產品外銷金額達四億二千餘萬美元，佔農產品出口總值三五%。

在漁業各部門中，尤以遠洋及近海漁業的發展最具成效。遠洋漁船作業範圍現已遍及世界各主要海域，每年捕獲大量高價魚類外銷；近海拖網漁船在農復會協助下裝置凍結設備，提高了魚貨的商品價值。在水產養殖方面，養鰻事業的快速成長與烏魚人工繁殖的成功，受到國際間的矚目；虱目魚的單位面積產量較鄰近國家高達二～三倍；而目前正在推動中的養蝦事業、吳郭魚品種改良及牡蠣養殖技術的改進，更有極大的發展前途。

自民國五十年代起，由於漁產量逐年大幅增加，超過內銷市場的需要，經輔導製冰及冷藏工廠試行以魚片及蝦類加工外銷，產品範圍逐漸擴大，水產冷凍加工品六十五年出口金額達美金一億二千萬元。在水產罐頭方面，經於五十八年起以低利融資協助業者增添設備，改善罐頭品質拓展外銷，先後輸往歐洲地區及美國市場，六十六年出口量達八十萬標準箱。另資助學術機構完成多項調查研究計畫，亦間接促進臺灣水產罐頭外銷的發展。

農復會除在生產及加工技術方面推動各項改進及創新外，爲配合政府改善漁民生活，促進漁業增產的政策，對於漁港、船澳等基本設施與倉庫、曬魚場、導航標竿、製冰工廠等公共設施的改善亦甚重視。三十年來提供補助經費興建或改良擴大的漁港與船澳，包括有內埤、永安、竹圍、東石等廿九處。另爲提高內銷魚貨的品質與維護環境衛生，特於六十三年貸款協助漁業界共同創設冷凍運銷公司，每年承運魚貨七萬餘公噸，業者因魚貨售價提高而增加的收益達一億三千萬元。

民國六十二年發生世界性能源危機後，漁業經營成本突然增加，漁民瀕臨艱苦局面，加以世界各濱海國家紛紛宣佈設置二〇〇浬經濟海域及擴大領海，對我國遠洋漁業的影響至大。農復會爲因應此一漁業發展的新形勢，除已重新檢討我國二百浬海域內漁業資源現況，謀求充分利用與保護尚未開發的資源，使能維持最高持續生產外，並協助增建大型試驗船，加强勘探開發不受經濟海域限制的深海漁場。



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1. 尾拖式大型拖網船。
   Large stern trawler.
2. 農復會專家檢查經日曬加工後的沙丁魚。
   JCRR specialists inspecting sun-dried sardines.
3. 停泊在前鎮漁港中的動力漁船。
   Powered fishing craft anchored in Chienchen Fishing Harbor.

Fisheries Production and Technical Improvement

In the past three decades, the annual growth rates of fisheries production in Taiwan have averaged more than 10 percent. In 1977, the production was over 850,000 M.T., ranking 20th in the world; fishery exports totaled US$420 million, which was 35 percent of the value of all agricultural exports.

Deep-sea and inshore fisheries have shown especially fast growth. The fishing fleets of Taiwan now operate in all the oceans of the world, and most of their catch of high-value species is exported. The installation of cold storage equipment on inshore trawlers has resulted in better quality of the catch. In aquaculture, the rapid development of eel farming and the successful artificial propagation of mullet have drawn international attention. The yield of milkfish per unit area in Taiwan at present is 2-3 times higher than in neighboring countries. Good progress has also been made in shrimp farming, tilapia breeding and oyster culture.

Since the 1960's, the annual fish catch has been more than enough to meet the domestic demand. Efforts have been made to help refrigeration plants to produce frozen and processed fishery products including fillets and shrimp for export. In 1977, US$120 million worth of such products were exported. To promote the development of the canned seafood industry, JCRR, besides supporting related research, has made low-interest loans to packers to install modern processing facilities so as to improve the quality of their products. The markets of Taiwan's canned seafoods include European countries and the U.S., to which 800,000 cases were supplied in 1977.

Construction and improvement of fishing harbors and shore facilities such as ice-making plants, net treating plants, warehouses and drying grounds have also been a major concern of JCRR. Over the years, a total of 29 harbors and anchorages have been built, expanded or improved with JCRR financial assistance.

The world energy crisis and the setting up of 200-mile exclusive economic zones and extension of territorial waters by many maritime nations in recent years have caused difficulties to the fishing industry of Taiwan. To cope with this situation, JCRR has taken steps to reassess the island's inshore fisheries resources with a view to conserving and utilizing them properly for attaining maximum sustainable yield, and to help construct large-sized research vessels for intensifying the search for new deep-sea fishing grounds beyond the control of other countries.

3

興建動力漁船及推廣合成纖維漁網線

臺灣光復初期，漁船及陸上設備多遭毀損，不堪使用，遠洋漁業幾呈停頓狀態。民國三十八年七月，政府宣布民間可自由經營漁業，但投資經營者不多。自四十二年起開始實施四年經建計畫，農復會配合在技術與資金方面給予支援，積極建造動力漁船以擴大作業範圍，引進新的技術與漁業資材以提高漁獲量。在四十年代以增加漁業生產爲目標的發展過程中，農復會協助推動漁船動力化與合成纖維漁網線，對海洋漁業的發展影響最大。

臺灣動力漁船的數目在四十五年時僅有三、二一五艘，六十五年已增至一一、八四九艘；無動力漁船則由二二、五五六艘減爲一一、七〇〇艘。至於漁網具的改良，經引進合成纖維漁網具取代傳統的棉、麻網具，由於無需施以網片防腐處理，可節省大量勞力及費用。五十三年引進的北歐型網具，使瀕臨絕境的拖網漁業得以復甦。六十年代更引進發展尾拖式大型拖網及配合魚羣棲息的中層拖網漁法，爲拖網漁業界帶來了新的希望。

漁撈機械化及漁船設備科學化

自五十年代起，農復會協助漁民在漁船上裝置電動及油壓式起網機、捲揚機、揚繩機、操舵機等機械設備，以增加漁獲效率；並倡導使用魚羣探測器及羅遠、雷達、方向探測儀等科學儀器。除貸款漁民購買此等設備外，並辦理講習班教導使用方法。

1

CONSTRUCTION OF POWERED FISHING CRAFT AND EXTENSION OF SYNTHETIC FIBER NETS

With most fishing boats and shore facilities destroyed during World War II, the fishing industry of Taiwan, especially deep-sea fishing, was all but paralyzed in the early postwar period. Although the government removed in July 1949 the restrictions on private operation of deep-sea fisheries, few people made capital investments in the industry. In 1953, the first 4-year economic development plan was put into operation, and JCRR started giving technical and financial assistance to fishermen to construct powered fishing boats for extending the range of fishing and adopt new techniques and gear for increasing the catch. Mechanization of fishing craft and extension of synthetic fiber fishing nets as promoted by JCRR helped greatly the growth of marine fisheries in the 1950's.

During 1956-1976, the number of powered fishing boats increased from 3,215 to 11,849, while that of non-powered boats decreased from 22,556 to 11,700. Synthetic fiber fishing nets which require no treatment to minimize deterioration have now replaced nearly all of the natural fiber nets. In 1964, JCRR introduced from northern Europe a new type of trawlnet, which helped revive the then declining trawling fisheries. Another boost was given these fisheries with the introduction of large stern trawlers and the mid-water trawling method in the early 1970's.

MECHANIZATION OF FISHING OPERATIONS

Since 1960, JCRR has encouraged the fishermen, by providing them with loans, to install on their boats such mechanical devices and instruments as hydraulic net hauler, line hauler, steering gear, fish finder, loran, radar, and direction finder to increase their fishing efficiency.

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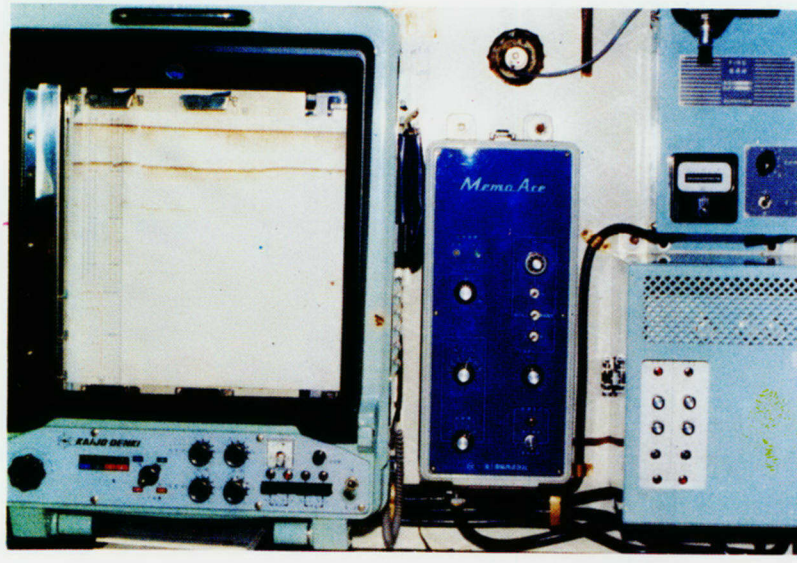

1. 合成纖維加工。
   Processing of synthetic fiber.
2. 油壓起網機。
   Hydraulic net hauler.
3. 魚群探測器。
   Electronic fish finder.

培育沿岸漁業資源

人工魚礁係將舊船、廢輪胎或水泥塊集中投放海中而構成，目的在改變海洋環境以提供魚類棲息場所。在農復會策劃下，近年來選定宜蘭、基隆、臺北、桃園、新竹、苗栗、高雄、屏東及澎湖等縣市沿岸適當地點，先後共投放價值約三千萬元的人工魚礁。經中央研究院漁業生物專家潛水調查，發現投放魚礁處已形成良好漁場，同時也間接防止沿岸漁場遭受拖網漁船破壞，使沿岸漁民的漁獲量增加，收入提高。

南極漁場的開發

農復會爲配合政府加速發展漁業的政策，協助開闢遠洋新漁場。經多方協調，利用中央加速農村建設補助經費，於六十四年九月在國內建造完成七〇〇噸級的「海功號」試驗船。多年來農復會曾不斷搜集各國漁業試驗資料，研判結果，認爲南極磷蝦資源極具開發價值，決定派遣「海功號」前往從事試驗作業。

「海功號」試驗船於六十五年十二月初啓航，六十六年三月圓滿達成任務返回臺灣，共捕獲南極蝦一三五公噸。此次試驗充分顯示我國漁撈技術的進步與國造漁船的優異性能，並證實可以商業性開發南極蝦資源。

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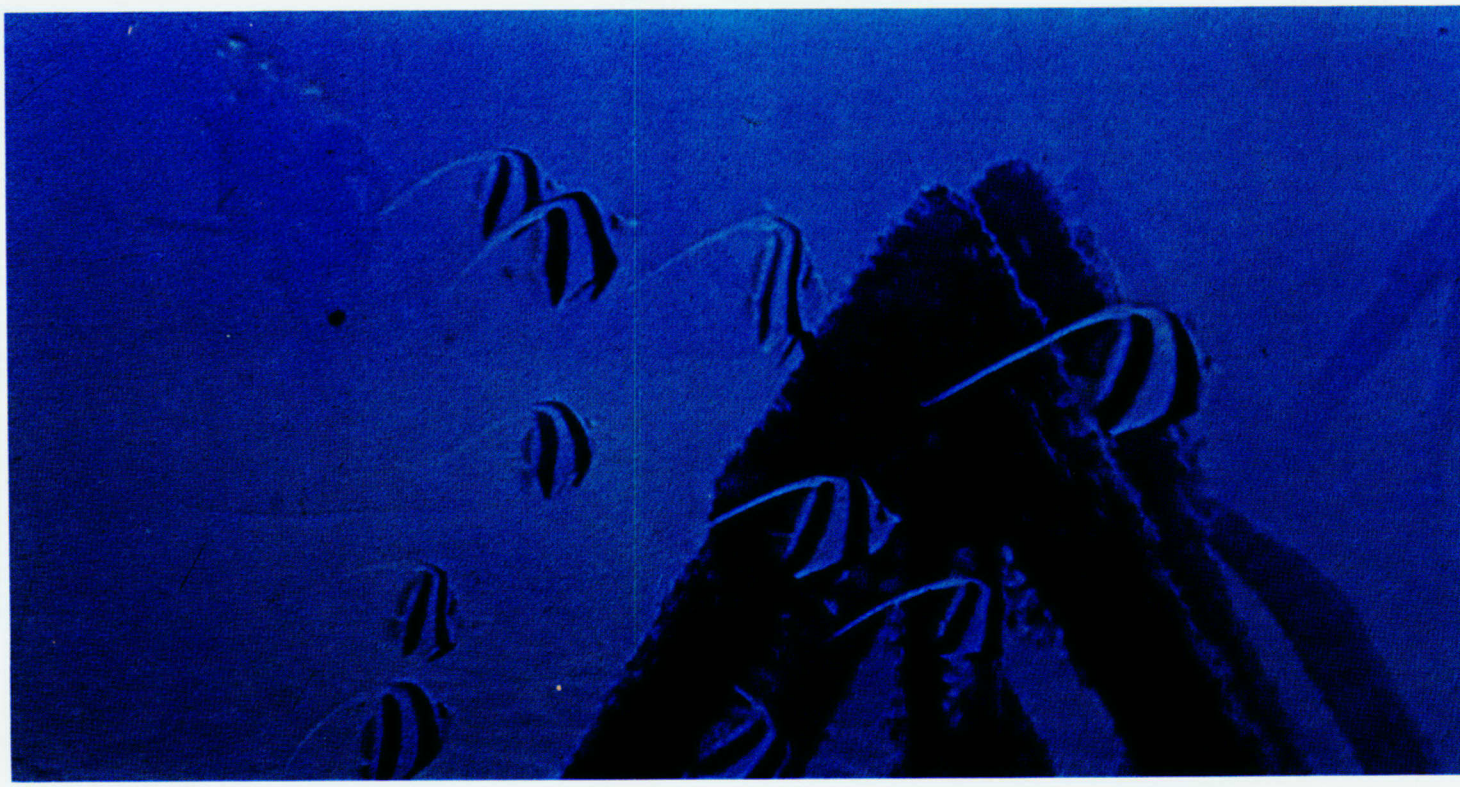

REPLENISHMENT OF COASTAL FISHERIES RESOURCES

Artificial reefs, consisting of scrapped fishing boats, old tires and cement blocks sunk to the bottom of the sea, form new habitats for marine organisms. Under the planning of JCRR, artificial reefs valued at NT$30 million have been established in recent years in the coastal waters of Ilan, Taipei, Taoyuan, Hsinchu, Miaoli, Kaohsiung, Pingtung, Penghu and Keelung. An investigation made by the Institute of Zoology of the Academia Sinica shows that these reefs have been highly effective in attracting fish and their surrounding areas have been turned into good fishing grounds.

EXPLOITATION OF ANTARCTIC FISHING GROUNDS

To exploit new fishing grounds in distant waters, a 700-ton research vessel christened "Hai Kung" was built for the Taiwan Fisheries Research Institute in September 1975 under an ARDP project. JCRR, having for several years studied information on antarctic fishing experiments collected from foreign countries, decided to send the vessel to the Antarctic Ocean for exploratory fishing of krill. The Hai Kung left Keelung in December 1976 and returned with a krill catch of 135 M.T. in March 1977. The success of this experimental cruise not only demonstrates Taiwan's superior techniques of fishing and shipbuilding, but also points to the feasibility of commercial exploitation of the krill resources.

1. 捕獲的南極蝦。
   Antarctic krill brought back by the Hai Kung.

2. 置放一年後的人工魚礁。
   A one-year-old artificial reef.

3. 海功號試驗船下水典禮。
   Launching of the research vessel "Hai Kung."

水產養殖技術的改善

在我國淡水養殖事業中佔極重要地位的鯉類，包括草魚、白鰱、鰱、鯪等。農復會鑑於臺灣缺乏天然魚苗，民國四十九年起積極協助臺灣省水產試驗所臺南分所調查鯉類的產卵情形，並試驗以腦下腺荷爾蒙注射促進卵巢成熟排卵，至五十四年已可大量生產養殖所需的魚苗。另補助水產試驗所及國軍退除役官兵輔導委員會桃園魚殖處，進行淡水魚塭施用化學肥料的試驗，發現以白鰱爲主的魚塭中使用化學磷肥可以增加產量二至三倍。由於養殖方法的改進，鯉類的產量自五十一年的四、三三〇公噸增至六十五年的一九、九八四公噸。

吳郭魚自民國三十三年及三十五年兩度引進臺灣後，迅速在各地水田、水道、池塭間繁殖，成爲產量最多的一種淡水魚。但因原引進的爪哇吳郭魚外表漆黑、體型小，市場價值甚低，多供爲農村地區消費。五十九年臺灣省水產試驗所鹿港分所以尼羅魚與爪哇吳郭魚雜交，育成新種，取名爲福壽魚，魚體呈灰色或淡青色，養成體型較大，深受消費者歡迎；其生長率約爲爪哇吳郭魚的一．四倍，同時可提高養殖漁戶的生產效率及經濟效益。農復會自六十二年起，協助推廣此種雜交吳郭魚的養殖，六十六年分配民間養殖的雜交魚苗已近一千萬尾，並有活魚及冷凍魚外銷日本。

鰻爲高價淡水魚種，適合集約養殖。農復會於民國五十五年補助臺灣省水產試驗所研製人工混合飼料，取代較難儲存且供應不穩定的雜魚作爲集約養鰻的飼料，目前已爲養鰻場普遍採用。實施集約養殖的結果，魚病問題漸趨嚴重，六十一年起補助臺灣大學漁業生物試驗所及師範大學生物研究所展開魚病調查研究工作。除鑑定臺灣養殖鰻魚的寄生蟲及細菌等病原外，對於鰻病發生的生態因素及型態也多有瞭解。六十四年再補助養豬科學研究所、輔仁大學生物系及臺灣大學獸醫系，以其在寄生蟲及藥品學等方面的研究基礎，參加魚病的預防及治療試驗研究。六十六年並於屏東農業專科學校設立魚病診療服務中心，爲屏東地區養鰻業者提供服務。

1. 福壽魚。
   Hybrid tilapia.
2. 魚池施肥。
   Application of fertilizer in fishpond.
3. 農復會前主任委員沈宗瀚及委員郝夫曼在前漁業組組長陳同白（中）陪同下參觀一家養魚場。
   Former JCRR Chairman T. H. Shen and Commissioner Gerald H. Huffman visiting a fish farm in the company of T. P. Chen (center), a former chief of JCRR's Fisheries Division.

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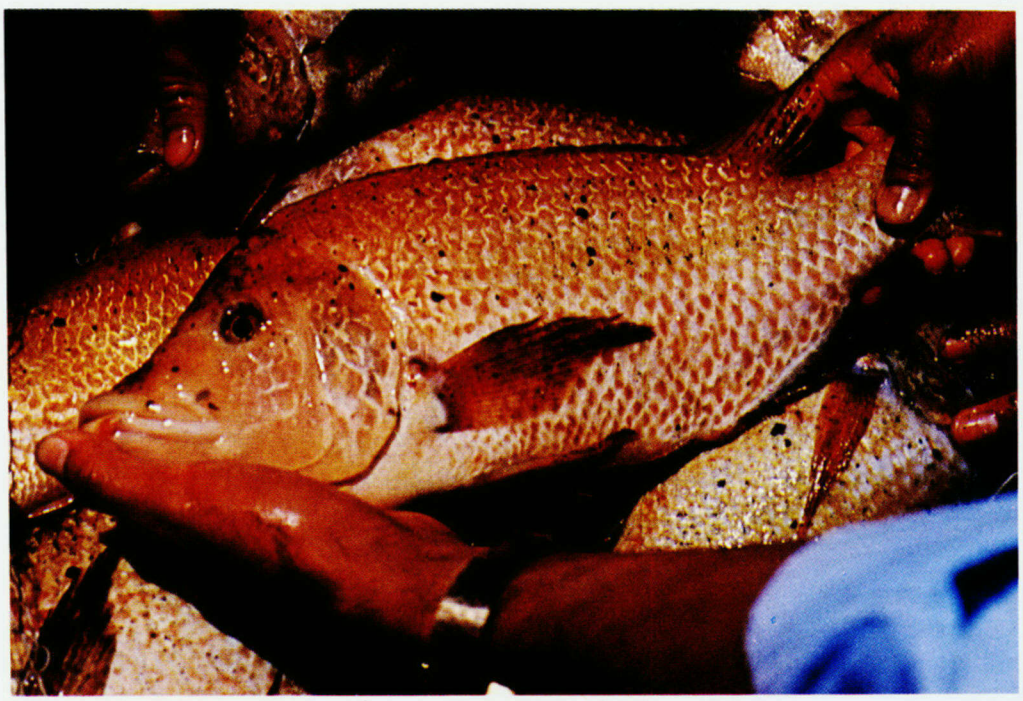

2

IMPROVEMENT OF AQUACULTURE TECHNIQUES

Chinese carps, which include silver carp, big-head, grass carp and mud carp, are the most important cultured fish species in Taiwan. Formerly, the fingerlings required to stock the ponds were all imported untill 1962 when the technique of induced spawning by means of pituitary injection was successfully developed by the Taiwan Fisheries Research Institute with JCRR assistance. By 1965, it had become possible to supply all the fingerlings needed locally.

To increase pond fish production, JCRR also assisted in the conduct of experiments and demonstrations on the application of chemical fertilizers in fish ponds. It was found that the use of superphosphate could increase the yield of silver carp from two to three times. Improved culture methods boosted the annual carp production from 4,330 M.T. in 1962 to 19,984 M.T. in 1976.

Introductions of the Java tilapia, (*Tilapia mossambica*) were made in 1943 and 1946. As this species thrives in stagnant warm water, it was soon popularly raised in rice fields, irrigation canals and reservoirs, and became one of the most abundant pond fishes in Taiwan. However, because of its rather small size and darkish appearance, Java tilapia was considered an inferior fish. In 1970, interspecific breeding between Java tilapia and Nile tilapia (*Tilapia nilotica*) was successfully done by the Lukang Fishculture Station of the Taiwan Fisheries Research Institute. The hybrid is of a desirable bluish or greyish color and able to grow to a considerable size before attaining maturity, which makes it more acceptable to the discriminating urban consumers. Furthermore, hybrid tilapia grows nearly 1.4 times as fast as the parental Java tilapia. Under a JCRR-supported extension program started in 1973, about 10 million fry of the hybrid were distributed in 1977.

Eel, a high-value freshwater fish, can be raised at high density under confined conditions. With JCRR financial support, an experiment on the substitution of formulated feed for trash fish in eel farming was successfully carried out by the Taiwan Fisheries Research Institute in 1966. Formulated feed is now extensively used by the eel farms. With intensive eel culture, however, fish disease has become a serious problem. A JCRR-supported research project was started in 1972 by the Institute of Fishery Biology, National Taiwan University, and the Institute of Biology, National Taiwan Normal University. Under this project, several causative organisms of eel disease have been identified and their environmental factors investigated. Another project, in progress since 1975 at several research institutes, has extended the research work to the prevention and control of fish disease. A fish disease clinic has been set up in Pingtung to serve the local eel farmers.

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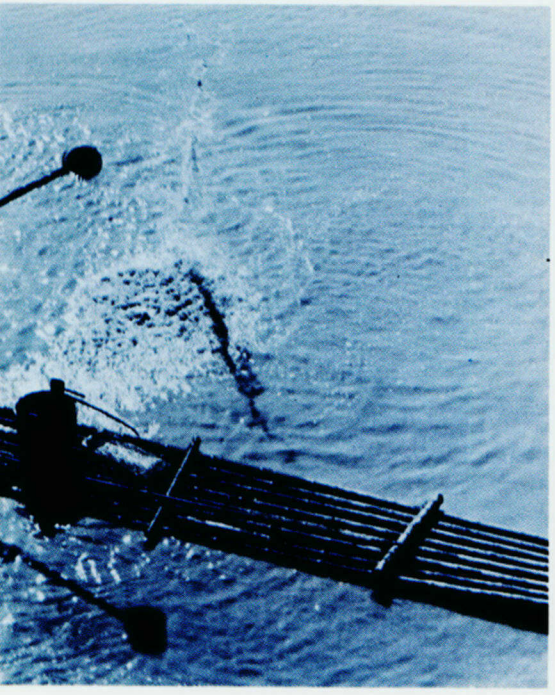

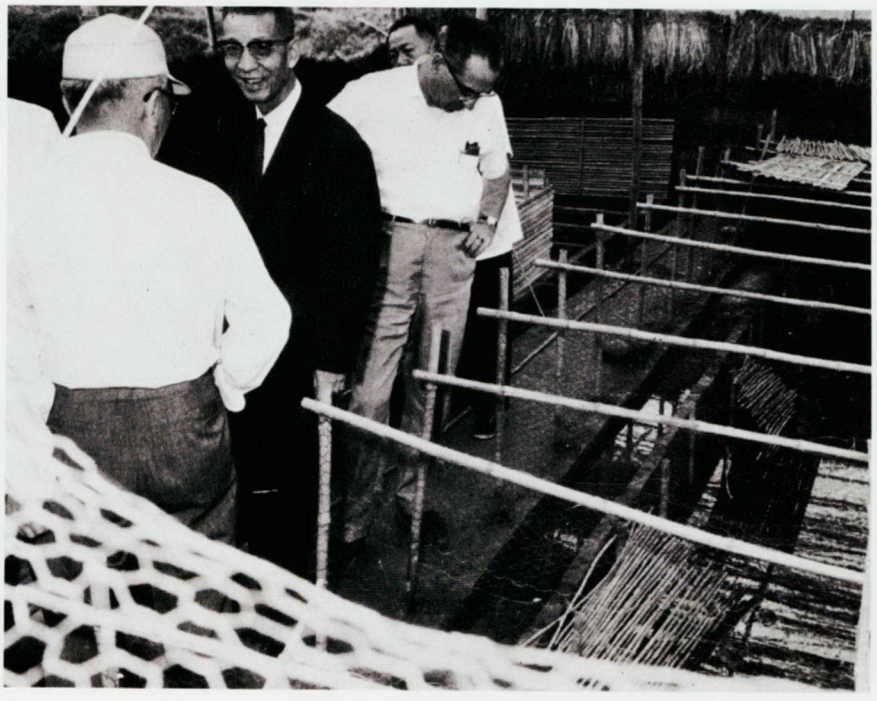

臺灣的氣候條件適合多種蝦類生長。農復會於五十二年起補助臺灣省水產試驗所進行斑節蝦、草蝦的養殖與人工繁殖試驗，五十七年發展成功蝦苗人工繁殖技術，奠定了近十年來發展養蝦事業的基礎。水試所東港分所最近進行的試驗，發現每平方公尺魚塭最高可放養十五尾，證實可採行高密度養殖。經提供貸款推動草蝦的養殖，六十五年底臺灣地區養蝦面積已超過一千公頃。

牡蠣養殖在臺灣已有兩百餘年的歷史，均採用插竹式，養殖地區僅限於海埔地或淺灘，每公頃生產牡蠣肉約五〇〇公斤。爲提高單位面積產量，農復會於四十年代後期協助臺灣省水產試驗所引進簡易垂下式養殖法，每公頃產量可達插竹式養殖法的二至三倍；四至六個月就可收穫，且養殖作業範圍可向外海延伸至淺海海域。六十一年又協助水產試驗所在澎湖試驗延繩式吊蚵養殖成功，使牡蠣養殖範圍更可推展至風浪較大，水深二〇公尺以上的海域，單位產量則可增至每公頃二〇噸。臺灣牡蠣養殖面積已達一萬公頃，由於沿岸淺海多遭工業廢水污染，不能開闢新養殖場，延繩式養殖爲最可行的增產方法。目前此法已在澎湖推廣。

1. 養鰻場風光。
   A commercial eel farm.
2. 插竹式牡蠣養殖。
   Oyster culture by the bamboo stick method.
3. 垂下式牡蠣養殖。
   Oyster culture by the hanging method.

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The subtropical climate of Taiwan is suited to the growth of shrimp. With JCRR financial support, the Taiwan Fisheries Research Institute began to experiment with the culture and artificial propagation of Kuruma shrimp and grass shrimp in 1963. A technical breakthrough achieved in 1968 has made mass production of shrimp seeds possible. This has greatly contributed to the development of shrimp farming in Taiwan.

According to a recent report of the TFRI Tungkang Marine Laboratory, as many as 15 shrimps can be raised per square meter of pond area, which shows the feasibility of high density shrimp culture. The total area of shrimp farming has now exceeded 1,000 hectares.

Culture of oysters began in Taiwan about 200 years ago. By the traditional bamboo stick method, the culture activity is limited to the coastal tidal flats and shallow water areas, and the unit yield is only 500 kg per hectare per year. In an effort to increase oyster production, the Taiwan Fisheries Research Institute, with JCRR assistance, introduced the simple hanging method in the late 1950's. With this method, the unit yield can be more than doubled, and the area of culture can be enlarged to include deeper water regions. In 1972, experiments on long-line oyster culture were successfully completed by TFRI in Penghu. The long-line method, being adaptable to rough sea conditions, can be practiced in areas farther away from the shore, and it brings an average unit yield of around 20 M.T. per hectare. At present, the total oyster culture area in Taiwan is in excess of 10,000 hectares. Since most of the coastal regions suitable for oyster culture are severely polluted by industrial wastes, extension of the long-line method is considered the best way to increase oyster production in the future.

3

農業機械化

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臺灣推行農業機械化，初期主要目的在求精耕，因耕牛不足而引進整地機械以補充畜力。以後由於工商業快速發展，導致農村勞力外移、工資上漲、農業勞力老化等問題，嚴重影響生產。政府乃於五十九年核定「加速推行農業機械化方案」四年計畫，並提撥農機貸款資金及補助經費，大力推動農業機械化。經過多年的努力，稻作生產作業機械化已有相當基礎及成就，他如林業、畜產及漁業的機械化仍多在萌芽階段。六十六年九月，蔣總統經國先生在行政院院長任內宣佈繼十大建設後推動的十二項建設，其中一項即爲「設置農業機械化基金，促進農業全面機械化」，預期至民國七十一年時，臺灣地區將有三十六萬台各種農漁機具可資利用，而其遠程目標，則爲達到農、林、漁、牧自生產、收穫、集運、包裝以至倉貯的機械化一貫作業。

農復會自民國四十三年引進耕耘機開始，始終配合政府發展農機政策，提供資金協助有關單位辦理農機的改良、示範、訓練及推廣工作，其中尤以對農作物整地、種植、收穫及乾燥等作業機械化的推動，收效最大。

整地機械化

民國四十三年農復會自美國引進七台不同型式的園圃式耕耘機，次年再自日本引進多種型式的耕耘機，經試用後選擇其中小馬力（約二・五）日本式耕耘機予以推廣。至四十六年，耕耘機已逐漸爲農民所接受，數量及使用馬力，逐年都有增加。國內製造耕耘機係四十七年開始，五十年已奠定基礎，進口耕耘機逐漸爲國產品替代。六十年時，耕耘機推廣數量達三萬二千餘台，可取代耕牛十六萬頭，約三十萬公頃農田已使用機械整地。由於農復會與農機研究機構不斷輔導改良，國產農機的性能及耐久性逐漸超過日貨，售價目前亦較日貨低二〇%左右。至民國六十六年底止，臺灣耕耘機累計已達六萬五千餘台，整地作業的機械化程度超過七〇%。國產農機除供應國內市場外，並可外銷。

鑒於耕耘機在旱田的整地效率不高，農復會於六十年開始引進曳引機，進行旱地機耕示範。六十二年起補助農林廳種苗繁殖場及棉麻試驗分所成立曳引機代耕隊，爲農民提供代耕服務，同時支援經濟部農訓中心舉辦農民曳引機操作保養訓練班。六十六年底，農民已購用曳引機約一千二百台。

1. 園圃式曳引機。
   A garden tractor imported from the U.S.

2. 小型耕耘機。
   A small power tiller imported from Japan.

Agricultural Mechanization

In the 1950's, farm mechanization in Taiwan was primarily directed at extending the use of power tillers to relieve the shortage of draft animals. Later, with more and more farm labor drawn away by the rapidly developing industry, the efforts had to be stepped up. The government put into operation in 1970 a four-year farm mechanization promotion program, under which loans and subsidies were provided to farmers to buy agricultural machines/implements. As a result, considerable progress was made in the development of mechanized rice culture in the early 1970's.

In September 1977, the government announced a series of 12 new economic development programs. One of them calls for the setting up of a fund for promoting overall agricultural mechanization; it is expected that by 1982 there will be 360,000 units of various types of farm machines in use. The long-range goal is to achieve integrated mechanization of the production, marketing and warehousing operations for all components of agriculture: crop farming, forestry, fisheries and animal husbandry.

Since 1954, in line with the government farm mechanization policy, JCRR has been actively assisting agricultural research agencies in the improvement, demonstration and extension of farm machines. The results achieved in the mechanization of land preparation, planting, harvesting and drying for field crops have been especially notable.

蔣總統經國先生親自操作新發展成功的坡地動力搬運車。
President Chiang Ching-kuo at the wheel of a motor-cart newly developed for slope land use.

MECHANIZATION OF LAND PREPARATION

JCRR introduced seven small garden tractors of different types from the United States in 1954 and several models of power tillers from Japan in 1955. After trial use, a small 2.5 hp Japanese-made tiller was selected for extension as a substitute for draft cattle. Gradually accepted by the farmers, power tillers steadily increased in both quantity and engine power. Local-made tillers, which first appeared in 1958, began to dominate the domestic market after 1961. By 1971, 32,000 units had been extended. These machines could replace 160,000 head of draft cattle and take care of land preparation for about 300,000 ha.

At the end of 1977, the number of power tillers grew to 65,000 units, and the extent of mechanization for land preparation exceeded 70%. Under the guidance of JCRR and related research agencies, the local-made tillers have been improved continuously; they are now better than Japanese products in performance and durability but sell at prices about 20% lower.

As power tillers are too small for dryland tillage, tractors were imported in 1971 for demonstration purposes. In the following year, JCRR helped the Taiwan Seed Service and the Taiwan Fiber Crops Experiment Station organize tractor teams to render custom tilling service to farmers in the planting of dryland crops. Meanwhile, with JCRR support, training courses in the operation and maintenance of tractors were conducted for farmers by the Agricultural Vocational Training Center of the Ministry of Economic Affairs. At the end of 1977, the number of farmer-owned tractors totaled 1,200 units.

種植機械化

農復會於五十五年自日本引進手推式單行插秧機，委托臺北區農業改良場進行試驗，以後再引進雙行式動力插秧機，分配各區農業改良場試用，並在各鄉鎮辦理示範推廣。經輔導國內農機工廠自行生產，目前農民已擁有動力插秧機一萬餘台。爲配合插秧機的推廣，最初在彰化花壇鄉農業經營實驗區創設水稻專業化育苗作業，五十九年起透過農林廳補助各地鄉鎮公所或農會及農民設置水稻專業化育苗中心。現全省已設置三四九處，最大的育苗中心可供應三〇〇公頃稻田所需的秧苗。水稻專業化育苗作業不僅可促進水稻插秧機的推廣，也有利於統一栽培品種、育成健全秧苗、調節插秧適期及安排灌溉用水，因此已列爲稻米增產及機械化的一項重要措施。

在其他種植機械方面，五十六年協助花蓮區農業改良場從事水稻直播試驗及直播機的改良，經多次研究改進及示範，目前已推廣國產改良式水稻直播機約三、二〇〇台。至供雜糧作物如花生、大豆、玉米及高粱使用的動力牽引播種機，分別由臺南與高雄改良場及種苗繁殖場進行研究改良，並以國外引進較大型的播種機配合曳引機從事機械播種，現正在中南部大規模示範及推廣中。另爲推廣冬季休閑水田栽培馬鈴薯，經協助國內農機工廠仿照進口機型製造適合臺灣環境的馬鈴薯種植、施肥兼用機，已達成功階段。

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1. 手推式插秧機。
   Testing of a hand-pushed rice transplanter.
2. 動力插秧機。
   Field use of motorized rice transplanters.

3

MECHANIZATION OF PLANTING

Beginning in 1966, JCRR introduced hand-pushed and motorized rice transplanters from Japan for testing and demonstration at the seven DAISs. Through subsequent extension efforts, the number of rice transplanters owned by farmers has increased from year to year and now there are more than 10,000 units in use, all locally made. To supply healthy seedlings required in mechanical transplanting, 349 nursery centers have been set up since 1970 at various localities by township offices, FAs or individual farmers. The operation of the nursery centers has been helpful to the extension of rice transplanters, unification of rice varieties, and planning of irrigation schedules.

With regard to other farm machines, in 1967 JCRR assisted the Hualien DAIS in experimenting with direct rice seeding and improving the direct-seeder. After repeated trials and demonstrations, about 3,200 units of local-made direct-seeders have been extended to the farmers.

The use of large planting machinery for peanuts, soybeans, corn and sorghum has been studied and demonstrated by the Taiwan Seed Service and the Taiwan and Kaohsiung DAISs in central and southern Taiwan. In order to promote the cultivation of potatoes as a winter catch crop, a type of potato planter attached with a fertilizer applicator has been successfully developed by modifying imported ones to suit local conditions.

3. 一處育苗中心的苗圃。
The seedbeds at a communal rice nursery center.

4

5

4. 大型插種機。
A modified unit planter.

5. 馬鈴薯種植機。
A modified potato planter.

收穫機械化

各種農作物的收穫作業，耗費人工最多。過去臺灣農村中僅有木製脚踏脫穀機，收穫則全賴鐮刀類農具。農復會爲減輕農民辛勞並解決收穫季節勞力供應問題，歷年來協助農業試驗機構與農機工廠將木質脚踏式脫穀機改鋼鐵製，並配以五馬力引擎及選別裝置；改良及製造由日本引進的水稻聯合收穫機，克服其原有脫粒時易生阻塞及耐用性較低等缺點；研製苧麻、瓊麻及蓖麻等作物的田間採纖機；研製高粱、大豆及玉米等動力脫粒機，現已普遍推廣；改造並生產馬鈴薯及黑皮波羅門參收穫機。

1

乾燥機械化

臺灣中南部第一期水稻及北部第二期水稻收穫期正值雨季，稻穀因受雨害發芽霉爛的損失至爲可觀。農復會四十二年起卽開始研究稻穀收穫後的人工乾燥方法，四十四年首先完成簡易烘乾設備，曾由糧食局在宜蘭地區推廣五〇〇座以上。四十三年協助種苗繁殖場試製小型箱式烘乾機，經臺灣大學及農試所等機構多年來研究改進，發展成爲今天農民普遍採用的箱型稻穀烘乾機，至六十六年底推廣已近一萬三千臺。

四十三及四十四年農復會曾由美國引進循環式及塔式兩種大型烘乾機，並在臺灣試製廻轉式大型烘乾機。經過不斷研究改進，至五十四年，種苗改良場及四個鄉鎮農會已開始使用國產大型玉米乾燥機。六十一年再自日本引進大型稻穀烘乾機，設置於臺南縣白河鎮農會，配合水稻機械化一貫作業使用。目前已有十三個鄉鎮裝用類似及經改良的國產大型循環式稻穀烘乾機。另協助農試所設計改造引進的各型稻穀烘乾機，六十三年完成「農試型循環式烘乾機」，交由國內農機工廠仿造並作部份改進，成爲目前推廣中的各種廠牌小型循環式烘乾機，至六十六年底已推廣約五千五百台。

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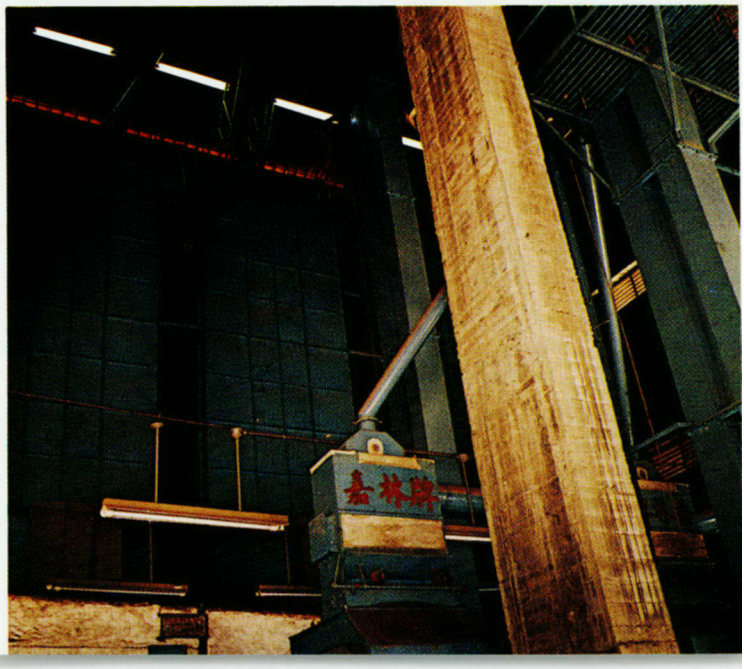

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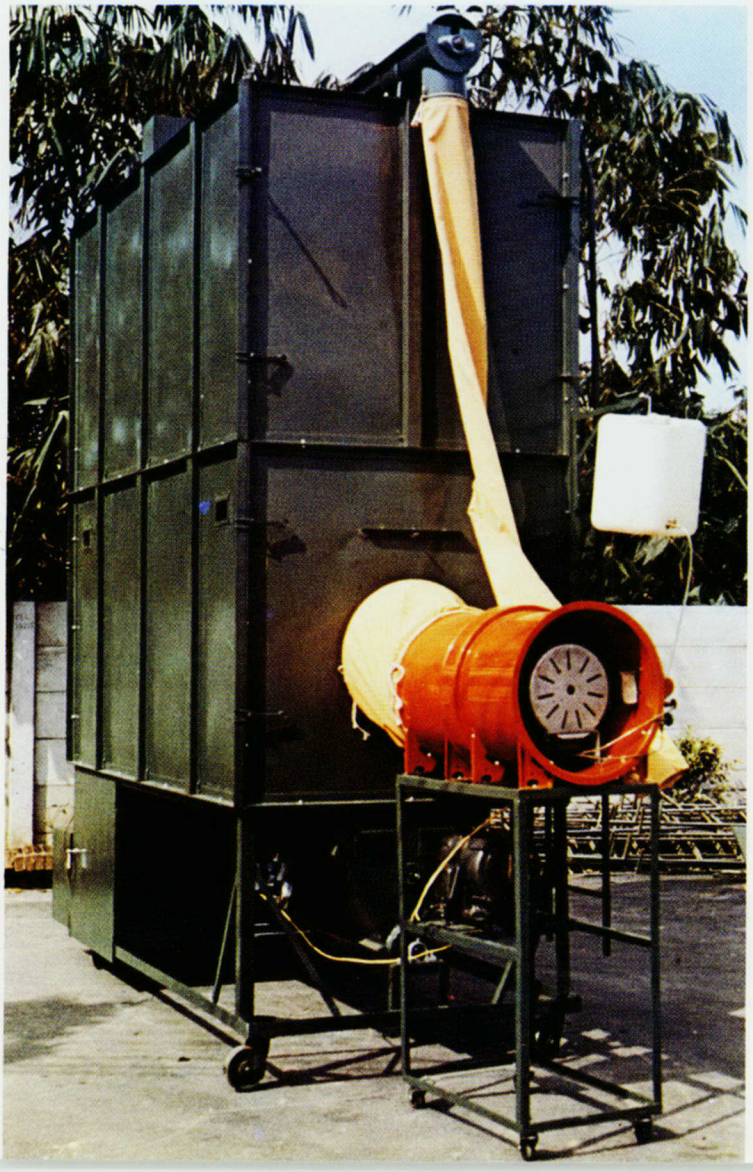
1. 水稻聯合收穫機。
   An improved rice combine.
2. 黃麻採纖機。
   A local-made jute decorticator in operation.
3. 大型稻谷乾燥機。
   A locally developed large drying plant.
4. 小型循環式稻谷乾燥機。
   A small circulation-type dryer developed by TARI.

MECHANIZATION OF HARVESTING

Among the various farm operations, harvesting is the most labor-consuming. In the past, harvesting of rice was done with a sickle for cutting and a pedal thresher for threshing.

To make this work a less drudgery for farmers and ease rural labor shortage, JCRR has assisted agricultural research agencies and machinery makers in: (1) manufacture of steel pedal threshers (instead of wooden ones) attached with a 5-hp engine and cleaning/separating devices; (2) improvement of rice combines introduced from Japan and production of the modified versions; (3) development of decorticators for ramie, sisal, and ambari hemp; (4) production of power threshers for sorghum, soybeans, and corn; and (5) modification and production of potato and black-salsify diggers.



MECHANIZATION OF DRYING

The first rice crop in central and southern Taiwan and the second crop in northern Taiwan generally mature during the rainy season. As a consequence, the loss of paddy due to germination is often high. JCRR initiated a project in 1953 for studying the methods of artificial grain drying. A simple drying device was developed in 1955, and about 500 units of it were extended to the farmers in Ilan county.

With JCRR assistance, the Taiwan Seed Service developed a small bin-type dryer in 1954. After years of modification and improvement by the National Taiwan University and the Taiwan Agricultural Research Institute, this kind of dryer has become popular among the farmers. About 13,000 units were in use at the end of 1977.

In 1954-1955, JCRR introduced large-sized dryers of the circulation and tower type from the United States for trial purposes. With these serving as models, large corn dryers of the rotary type were later developed and installed at the Taiwan Seed Service and four township FAs for general use. In 1972, a large rice dryer imported from Japan was installed at the Paiho township FA; now locally made dryers of a similar but modified type are used by 13 FAs.

Besides, under a JCRR-funded project, a small circulation-type rice dryer patterned after imported ones was designed by TARI. With the completion of a prototype in 1974, dryers of this type have been produced locally. About 5,500 units were owned by individual farmers at the end of 1977.

4

水資源開發

臺灣水資源的開發，在過去三十年中由單目標的計畫逐步演進爲多目標的大型計畫，將灌溉、排水、防洪、發電、給水及土地開墾等項目都包括在內，對於增產糧食及促進工業發展甚有貢獻。

光復初期，農復會協助政府修復戰時破損的灌溉設施，二十六萬公頃水田得以迅速恢復生產。自民國三十九年起，先後支助八〇二個水資源開發利用計畫，其中屬於灌溉及土地墾殖的有二八五個，屬於排水的有十九個，屬於防洪工程的有四三個，其餘的四五五個則爲調查、規劃及試驗、研究計畫。

經過三十年來的建設，臺灣地區現有灌溉用水庫十八座，渠道幹支線五二、五六〇公里，灌溉用水井一、五四三口，及主要堤防八六七公里；這一套完整的農田水利設施，實爲促成臺灣農業飛躍成長的重要支柱。

農復會在協助政府推動臺灣的水資源開發工作中，除以經費及技術支援各項工程的興建外，對於基層組織農田水利會的業務改進亦甚重視。光復初期水利會多達三十九個，經輔導逐次合併改組，民國六十四年合組爲十六個水利會。爲期强化水利會的財務結構及灌溉管理工作，更先後協助制訂征收會費新辦法，及完成灌溉土地登錄與灌區平面圖，使水利會能有效擔負起水利設施的管理、養護及運用的責任。

彰化番雅溝排水系統。
The Fanyakou drainage system in Changhua county.

Water Resources Development

In the past 30 years, the focus of water resources development in Taiwan has gradually shifted from single-purpose projects to large-scale multi-purpose ones. The latter category of projects, which serve simultaneously the needs of irrigation, drainage, flood control, hydropower generation and land development, have contributed not only to increased food production but also to industrial development.

In the initial period, JCRR concerned itself with assisting the government in rehabilitating the irrigation and drainage systems that had been damaged during World War II. As a result, 260,000 ha of irrigated lands were brought back into production. Since 1950, JCRR has given support to a total of 802 water resources development projects: 285 on irrigation and land reclamation, 19 on drainage, 43 on flood control, and 455 on investigation, planning, experimentation and research.

At present, there are 18 reservoirs, 1,543 irrigation wells, 31,977 km of irrigation main canals and laterals, and 867 km of main flood prevention dikes in Taiwan. These facilities form the main body of the infrastructure on which agricultural development is based.

JCRR also has taken it upon itself to improve the organization and management of the irrigation associations. In the few years after the island was restored to the sovereignty of China, there were more than 37 irrigation associations. Later on, their number was reduced several times through reorganization and merger and it now stands at 16. In order to strengthen the associations' financial structure as well as irrigation management and operation, JCRR has helped them establish an improved system of membership fee collection, complete the registration of all irrigated lands and prepare irrigation maps, which are useful to them in managing, operating and maintaining their irrigation systems efficiently.

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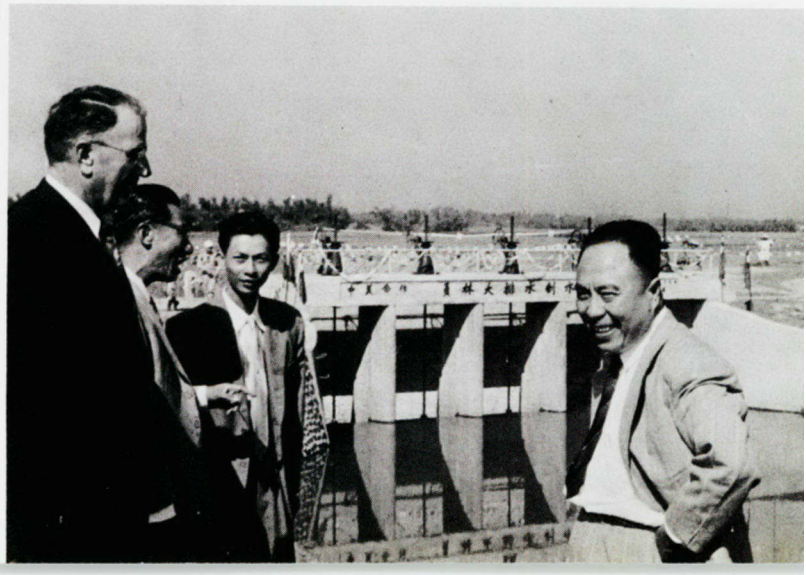

1 六十七年十月中旬蔣總統經國先生在宜蘭縣視察「婀拉」颱風對防洪設施造成的災害。

President Chiang Ching-kuo inspecting damage caused to flood control facilities in Ilan county by Typhoon "Ora," which hit northern Taiwan in October 1978.

2. 濁水溪田頭堤防。

The Tientou Levee of the Choshui River.

3. 農復會前水利組組長史密斯（左）及專家周禮（左二）與章元羲（右）視察員林大排水工程。

Former chief of JCRR's Irrigation and Engineering Division T. R. Smith (left) inspecting the Yuanlin Drainage Project in the company of Chow Lee (second from left) and Y. H. Djang (right), engineers of the division.

地下水的開發

雲林、彰化、屏東等地區地下水蘊蓄豐富，農復會於民國四十三年協助臺灣省水利局及臺灣糖業公司進行勘測工作。四十七年協助臺灣省政府展開第一個大規模的地下水開發計畫，雲林地區開鑿的二五四口深井，在四十九年的春季大旱中充份發揮了補充灌溉的效用。經陸續實施鑿井計畫，雲林、嘉南及屏東地區現共有深井七二〇口，水稻補充灌溉面積達六三、〇〇〇公頃。

節省水量增加灌溉

嘉南地區一二三、四〇〇公頃農田，曾因水源不足而僅能實施三年輪作制度。四十九年起，協助水利局及當地水利會分期將一、〇二四公里的幹支線渠道全部舖設內面工。滲漏損失自過去的四〇～五〇%減至二五%，每年約可節省水量達一億立方公尺，相當於整個烏山頭水庫的容量；移用於水稻及雜作的灌溉，對於增產幫助很大。

1

1. 抽取地下水以補充灌溉水源。
   Pumping of ground water to supplement irrigation water supply.

2. 地下深水井開鑿施工情形。
   Deep-well drilling operation.

3. 已完成混凝土內面工的水路開始輸水。
   A newly lined canal.

GROUND WATER DEVELOPMENT

From a geological point of view, the ground water resources in some areas of Taiwan are rich enough to warrant large-scale development. An investigation initiated by JCRR in FY1954 was conducted jointly by the Provincial Water Conservancy Bureau and the Taiwan Sugar Corporation. With JCRR support, the first large-scale ground water development project was started in Yunlin in 1958 and completed in 1961. Altogether 252 deep wells were drilled.

In 1960 there was a serious spring drought, but the crop loss in the Yunlin area was kept to a minimum thanks to the supplementary irrigation provided by the wells. This fact prompted the government to continue the ground water development program, under which a total of 720 deep wells were drilled in the Yunlin, Chianan and Pingtung areas. With the extra water thus made available, production on 63,000 ha of paddy land has been improved.

CANAL LINING

In the 123,400-hectare Chianan area, water was once so scarce that a three-year crop rotation system had to be practiced. Since 1960, JCRR has assisted the Provincial Water Conservancy Bureau and the local irrigation association in lining 1,024 km of canals, which could reduce the conveyance loss from 40-50% to 25%. In this way, 100 million cubic meters of water, almost the equivalent of the storage capacity of the existing Wushantou Reservoir, could annually be saved for the irrigation of rice and other crops to increase agricultural production in the area.

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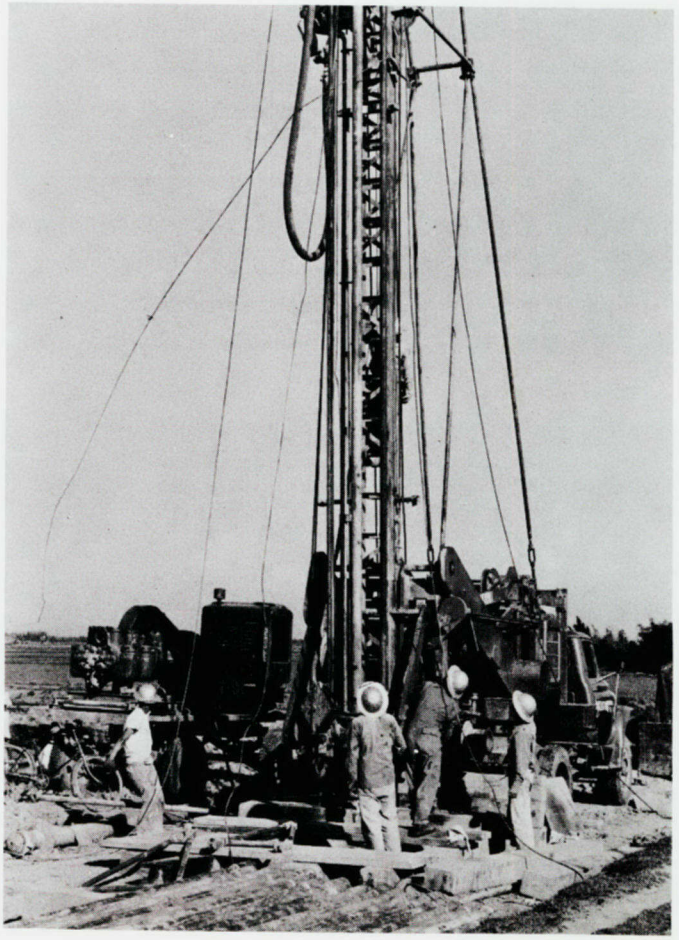

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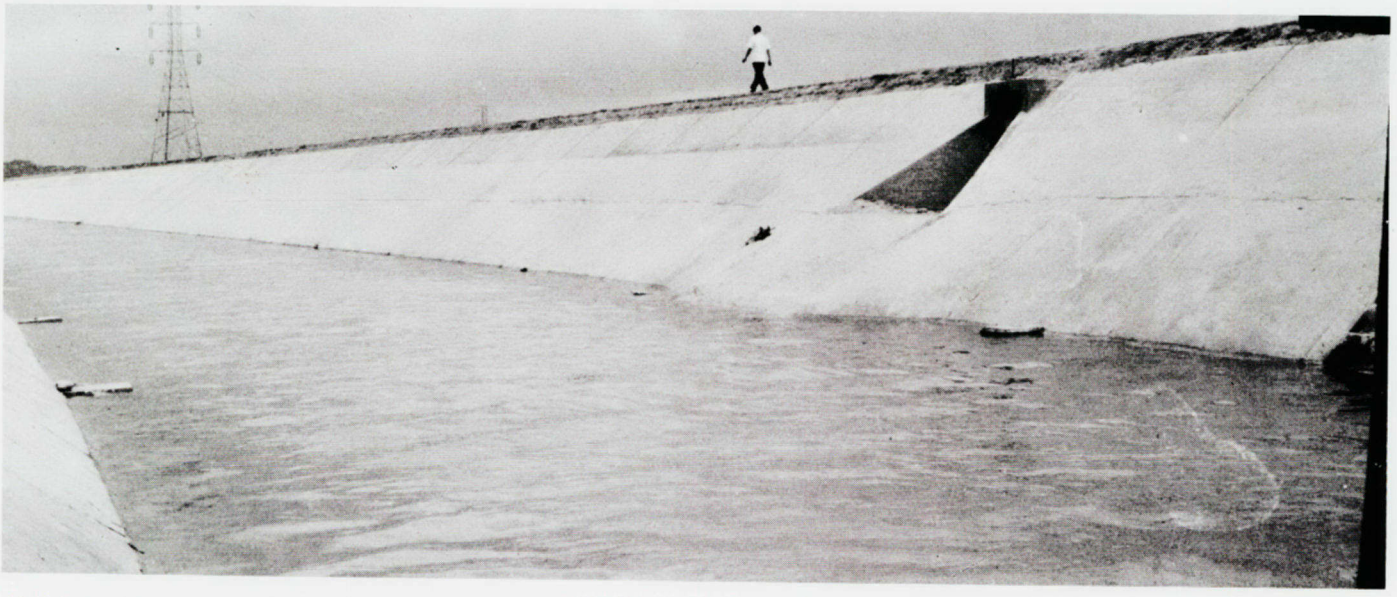

東部地區水利開發

花蓮、臺東兩縣開發較落後，光復初期糧食缺乏情形相當嚴重。四十年代中後期，農復會運用美援協助完成北埔、吉安、豐田、太平、關山、鹿野等圳渠的擴建及新建工程，總灌溉面積達五、八〇〇公頃以上。這些灌區內多爲原野荒地，經貸款協助農民開墾利用，成效良好。民國五十年以後，東部地區人口增加迅速，又爲配合安置退除役官兵的需要，經協助開墾河川地約五千公頃。近年來除策劃辦理防洪灌溉設施的改善外，並積極推動旱作灌溉，以增產雜糧、甘蔗及發展蠶桑事業。面積三八〇公頃的瑞穗旱作噴灌計畫已完成。卑南上圳計畫正在興建中，預定七十一年竣工後可增加灌區三千公頃。

海埔地的開發

爲增加農地面積，以減輕人口壓力，農復會早在民國四十四年時即已倡議開發海埔地，並協助政府派遣技術人員前往荷蘭、日本等國研習。五十年起陸續推動海埔地的調查、測量、規劃、農業試驗及實驗性開發工作，歷年來經開發完成可供使用的海埔地累計已達五千餘公頃。

1. 土渠水路舖設內面工情形。 Concrete-lining of an earth canal.

1

2

WATER RESOURCES DEVELOPMENT IN EAST TAIWAN

East Taiwan, a relatively underdeveloped region covering Hualien and Taitung counties, faced a serious food shortage in the decade following World War II. In the middle and late 1950's, JCRR gave technical and financial assistance to the Provincial Water Conservancy Bureau and local irrigation associations to carry out a series of irrigation canal construction and improvement projects, with the result that the total irrigation area in the region increased by more than 5,800 ha. As the newly created irrigation area was formed mostly of wasteland, JCRR also made loans to the farmers to reclaim and make proper use of such land for increasing food production. After 1961, in view of the rapid population expansion in East Taiwan and the need for resettlement of retired servicemen, JCRR further assisted in the implementation of a riverbed land reclamation program, under which 5,000 ha were made productive.

In recent years, JCRR has been making efforts not only to improve irrigation and flood control facilities, but also to promote dryland irrigation in order to increase the production of upland crops and sugarcane and to develop sericultural farming in the region. Already completed is the Juisui Upland Crop Sprinkler Irrigation Project which covers an area of 380 ha. Another project, which aims to utilize the Luyeh river as a water source, will be completed in 1982 to bring irrigation to 3,000 ha.

TIDAL LAND DEVELOPMENT

JCRR first advocated reclamation of the tidal flats on the west coast as a means of gaining new agricultural lands in 1955, and subsequently assisted the government in sending engineers to Holland and Japan for technical training. In the 1960's, JCRR also helped carry out a number of investigation, planning, and pilot reclamation projects, which laid the base for the actual development work undertaken later. To date, more than 5,000 ha of tidal lands have been reclaimed for crop farming, fish culture and other purposes.

2. 施工中的卑南上圳導水隧道出口。
Construction of the outlet of the diversion tunnel under the Upper Peinan Canal Irrigation Project.

3. 彰化海埔地寓埔區的水稻田與排水溝。
Paddy fields and a drainage channel in the Yupu Polder in Changhua.

3

海堤的整建

民國五十年代後期，臺灣西海岸所建海堤多次爲颱風侵襲所帶來的巨浪冲毀，造成嚴重災害，緊急搶修後常又遭冲毀。六十二年政府開始推行加速農村建設重要措施，即以整建海堤爲重點工作之一。農復會發現海堤不固的主要原因係未能根據潮汐與海浪資料，運用科學方法從事設計。經協助臺灣省水利局從根本上改善設計與施工方法，至六十六年已整建完成海堤八六・四公里。今後除繼續實施整建工程外，並將特別加强維護管理工作，使海堤得以充份發揮保護農業生產及人民生命財產安全的功能。

1

輪灌與雜作灌溉

在水利科技研究計畫中，以水稻輪流灌溉的實施最有績效，平時可節省灌溉用水二五%以上，在旱季時更可以有限的水量發揮最高的灌溉效用。六十六年春季臺灣普遍乾旱，第一期水稻因採行輪灌措施，插秧率仍能高達九九%以上。臺灣一般農民對雜作甚少施以灌溉，農復會首先協助嘉南水利會及臺灣大學在學甲及新港分設雜作灌溉試驗站與推行站，分別進行雜作灌溉試驗及輪作方式的示範，對目前正在逐漸形成中的嘉南地區雜作灌溉制度甚有貢獻。此外，協助臺灣省水利局在具有代表性的山坡地及砂丘地進行灌溉栽培試驗，證明可增加雜作產量達二五～五〇%。

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STRENGTHENING AND CONSTRUCTION OF SEADIKES

In the late 1960's, severe damage was caused to some of the seadikes on the west coast of Taiwan several times by violent onrushing waves brought on by typhoons, resulting in heavy loss of lives and property. Because of this, the work of strengthening and construction of seadikes has been made an important component of the government sponsored Accelerated Rural Development Program (ARDP) which was started in 1973. It was found that the vulnerability of the dikes was due mainly to inadequate planning and designing. With JCRR assistance, the Provincial Water Conservancy Bureau has improved the engineering designs and construction methods for all ARDP seadike projects, taking into account the available data on tides and waves. So far a total of 86.4 km of dikes have been strengthened and constructed.

ROTATIONAL IRRIGATION AND UPLAND CROP IRRIGATION

Among the technical innovations in water use introduced by JCRR, rotational irrigation for rice cultivation has proved particularly beneficial. This method normally can save water by as much as 25%, and in drought seasons it can lead to the most efficient utilization of the scarce water supply. A prolonged drought hit Taiwan in the spring of 1977, but with rotational irrigation it was still possible to complete on time the transplanting operation for the first crop of the year on 99% of the fields.

In Taiwan, upland crops generally produce low yields because the farmers do not make it a practice to apply water to them. To ascertain and show farmers the benefits of upland crop irrigation, JCRR has assisted the Chianan Irrigation Association and the National Taiwan University in conducting irrigation experiments and crop rotation demonstrations respectively at Hsuehchia and Hsinkang. The results of these efforts are now being used in developing an upland crop irrigation pattern for the Chianan area. With JCRR support, the Provincial Water Conservancy Bureau has also conducted experiments on irrigated agriculture in a number of selected slope land and sandy areas, which indicate that upland crops could yield 25-50% more through irrigation.

1. 輪流灌溉分水及操作情形。
   Operation of a turnout gate in a rotational irrigation system.

2. 高雄縣蚵子寮海堤保護蚵寮及赤嵌二村。
   The Kotzuliao Seadike in Kaohsiung county, which protects two coastal villages.

3. 砂丘地香瓜噴洒灌溉試驗。
   Sprinkler irrigation experiment in a sandy-land melon field.

4. 彰化海堤的維護工作。
   Seadike maintenance work.

鄉村衛生改善

農復會工作目標之一，爲改善農民的生活環境。三十年來共核准七百餘項補助計畫，協助地方政府及衛生機構辦理衛生改善工作，包括加强衛生醫療服務，防治急性傳染病、環境衛生改善、婦幼衛生、家庭計畫、村里衛生教育、營養改善等。

目前臺灣已建立範圍遍及全島的衛生網，透過這個系統，各種衛生及醫療計畫與服務可在基層農村中迅速普遍推行。經歷年來的努力，急性傳染病如鼠疫、天花、狂犬病、霍亂及瘧疾已告絕跡。其他疾病如白喉、砂眼、性病、血絲蟲病及結核病的病例亦有顯著的減少。由於婦幼衛生及家庭計畫的積極推行，人口出生率已自千分之三五・六（五十二年）降爲千分之二三・七（六十六年），自然增加率由千分之二九・六減爲千分之十九。

在環境衛生改善方面，由於積極修建自來水系統，給水率由十五%提高爲五七%；鄉村道路鋪設柏油路面及興建排水溝，使農家家戶衛生改善獲得了顯著的成就。在食物營養方面，每人每日從食物獲得的熱量已由一、二七七卡增至二、七九一卡。

三十年來，衛生條件及生活環境的改進，使國民平均壽命大幅延長。民國三十九年至六十五年期間，男性的平均壽命自五十三歲增至六十八歲，女性則自五十六歲增至七十三歲。

農村環境衛生及生活改善

臺灣光復初期，農村地區自來水多因在戰時損毀或年久失修，停止供水的情形甚普遍。農復會首先撥款協助修復七十七處簡易自來水設施，並改善及擴建十一個鄉鎮自來水系統，緩和了嚴重的缺水現象。以後政府逐年辦理給水改善計畫，但多限於城鎮人口較集中的地區。經協助臺灣省環境衛生實驗所運用聯合國兒童基金會捐贈的器材興建簡易自來水設施，爲偏遠農村或烏脚病地區解決供水問題，二十年內共完成簡易自來水設施七百六十二處，受益人口達一百二十八萬餘人。

民國四十五年開始協助省教育廳及地方政府，積極推動學校環境衛生改善工作。先後興建標準廁所八八六座及二五二所學校簡易給水設備。五十三年起由省政府繼續擴大辦理，中央政府最近更核撥鉅額補助款，預計六十九年可全面解決臺灣地區國小及國中的給水與廁所問題。

鑑於改善農村生活環境的需要，首先倡導加强衛生教育與組訓民衆，四十五年在桃園縣龍潭鄉太平村展開工作，包括整理公私廁所及公私水井、興建簡易自來水設施、改善巷道與住屋衛生及垃圾處理等。五十三年起改以縣爲單位，激發民衆以自動自發及自助互助的精神，改善生活環境，實施地區有臺北、桃園、苗栗及屏東等縣。另於五十一年起在省政府衛生處及紅十字會配合下，派遣公共衛生護士駐在農村組訓民衆，推行個人與環境衛生改善及家庭計畫，並傳授急救及家庭護理技術。臺灣省政府亦於五十八年起推行一項十年社區發展計畫，全省四千一百零一個社區中有三千零八十一個社區已辦理完成，使用經費多達二十二億元，使整個農村大爲改觀。

國民小學自來水水質試驗。
Orthotoluidine test of chlorinated water before visiting JCRR officials.

農村簡易自來水設備。
Part of a rural water supply system.

Rural Health

During the past three decades, over 700 JCRR-supported projects aimed at improving rural living conditions in Taiwan have been carried out. They cover: strengthening of medico-health services, control of communicable diseases, maternity and child health care, family planning, environmental sanitation, village health training and nutrition improvement. These projects have brought into being, among others, an extensive network of township health stations through which public health services have come within reach of every village on the island. Other notable achievements include the following:

—Most of the acute communicable diseases such as the plague, smallpox, rabies, cholera and malaria have been eradicated. Diphtheria, trachoma, venereal disease, filariasis and tuberculosis have also been brought under control.

—The crude birth rate dropped from 36.3 per thousand to 23.8 per thousand, and the natural increase rate from 30.1 per thousand to 19.0 per thousand during 1963-1977.

—The percentage of population using tap water increased from 15% in 1950 to 57% in 1977.

—The per capita daily food availability grow from 1,277 calories in 1945 to 2,791 calories in 1977.

—The average life span of the poeple increased from 53 to 68 years for males and from 56 to 73 years for females during 1950-1976.

IMPROVEMENT OF RURAL SANITATION AND LIVING CONDITIONS

In the immediate post-World War II years, most of the waterworks in rural areas did not operate well owing either to damage suffered during the war or to poor maintenance. JCRR took the lead in allocating funds for the rehabilitation of water supply systems for 77 villages and 11 townships. Thereafter, the government has undertaken to improve water supply from year to year, but the emphasis has been on cities. To solve the problem of water shortage in remote villages and black-food-disease areas, JCRR has over the years assisted the Provincial Institute of Environmental Sanitation in constructing simple waterworks for a total of 762 rural communities, benefiting some 1,280,000 people in all.

JCRR initiated a school sanitation improvement program in 1956 in cooperation with the Provincial Department of Education and local governments. By the end of 1964, 886 standard latrines and 252 water supply units had been built. This program was later taken over by the Taiwan Provincial Government. It is expected that there will be enough toilet and water supply facilities for all primary and junior middle schools by 1980.

A demonstration program on village health and sanitation improvement was started at Taiping village of Taoyuan county in 1956. The work items included improvement of public and private lavatories and wells, construction of simple water supply systems, pavement of roads, home sanitation and refuse disposal. The scope of the program was later expanded to cover selected villages in Taipei, Taoyuan, Miaoli and Pingtung counties, where the people were encouraged to improve their living conditions on their own in a spirit of self help. Meantime, public health nurses were sent in teams to rural areas to train the villagers in personal hygiene, environmental sanitation, family planning, first aid and home nursing care. The success of the program prompted the Provincial Government to launch a ten-year community development program in 1969. By 1977, 3,081 out of 4,101 rural communities had completed their improvement work as planned at a total cost of some NT$2,200 million.

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1. 台灣烏腳病防治中心。
The Taiwan Black-foot Disease Control Center.

2. 國民小學標準化廁所。
The standard latrine for primary schools.

環境污染的防治

在工業急速發展及人口增加的情況下，臺灣地區的空氣及水污染問題日趨嚴重。六十四年起協助省衛生處環境衛生實驗所及水污染防治所，實施全面性的調查與研究，以求了解農業環境污染的程度及掌握其動態。經選定桃園及苗栗兩縣分別爲空氣及水污染防治試驗區，探求可行的污染防治辦法。

衛生工作網的建立

民國三十八年臺灣地區一〇四所鄉鎮衛生所中，幾有半數陷於停頓狀態，農復會首先採取撥贈藥品、器材與技術支援等方式，協助地方政府建立新的衛生所。四十一年全省已有衛生所三百六十所，但其建築多因長期失修而不堪使用；經再協助臺灣省衛生處及地方政府興建標準式衛生所房舍，至四十七年已有九〇%以上衛生所建造完成新舍。以後相繼在偏遠地區協助興建衛生所醫護人員宿舍，山地衛生室、漁區衛生室等。

六十四年起，配合行政院衛生署及省衛生處推行綜合醫療衛生計畫，在偏遠農村地區重建標準化二樓式衛生所房舍，並添置醫療器材，由省立醫院輪調醫師駐所服務，對加强醫療保健服務及促進民衆健康，效益甚大。

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ENVIRONMENTAL POLLUTION CONTROL

In view of the growing threat posed by industrial pollution to agricultural production, JCRR has since 1975 assisted the Provincial Institute of Environmental Sanitation and the Water Pollution Control Agency in undertaking a general survey to assess the damage already done as well as the extent of air and water pollution in major farming areas.

Meanwhile, the two agencies have conducted a pilot pollution control program in Taoyuan and Miaoli counties to search for feasible control measures.

ESTABLISHMENT OF ISLAND-WIDE HEALTH SERVICE NETWORK

Before 1950, nearly half of the 104 health stations in Taiwan were in a state of inactivity. JCRR provided assistance, chiefly in the form of medical supplies and technical advice, in rejuvenating these stations and establishing new ones. By 1952, the number of health stations had increased to 360. In the next six years, new buildings of a standard design were constructed for over 90% of the stations with JCRR financial support. Since 1973, under a comprehensive medico-health care program started by the National Health Administration and the Provincial Health Department, JCRR has helped rebuild and improve the services of the health stations in selected remote rural areas. By special arrangement, doctors of nearby provincial hospitals have been assigned to work in these stations on a rotation basis.

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1, 2. 農村排水溝及巷道改善前後比較。
A rural road before and after improvement.

3. 河川水質監測。
Monitoring of river water quality.

4. 農復會前鄉村衛生組組長許世鉅陪同外賓參觀農家。
Dr. S. C. Hsu, a former chief of JCRR's Rural Health Division, showing a farmhouse to visitors.

5. 目前的標準化鄉鎮衛生所。
A newly constructed standard health station building.

家庭計畫的創始與推行

臺灣地區的人口在民國卅五年時僅爲六百餘萬人，五十三年卽已增加一倍而達一千二百餘萬人，足見人口問題的嚴重。光復初期，政府尚未制定人口政策，社會人士及輿論均難接受節育的觀念，農復會故主任委員蔣夢麟博士首先倡導推行家庭計畫。三十八年起農復會提供經費及技術指導，協助民間團體及衞生機構先自分發教育手册及調查婦女生育率等工作着手。四十三年協助成立中國家庭計畫協會，再以孕前衞生的名義將家庭計畫納入婦幼衞生工作範圍內。

五十一年開始與美國紐約人口研究局、密西根大學及派氏基金會等合作，支援此項工作，並創辦軍中家庭計畫教育。五十七年政府公佈人口政策，以後陸續公佈臺灣地區家庭計畫實施辦法及人口綱領，至此家庭計畫正式成爲政府衞生行政的一個重要項目。臺灣地區的出生率現已降至千分之二十三點七，自然增加率也減爲千分之十九，對於緩和人口增殖已見成效。爲配合長程家庭計畫，復於六十年起，積極協助有關單位辦理學校人口教育，培養國小、國中及大專院校學生有關人口問題的正確觀念。

急性傳染病的控制

三十年前，臺灣地區人民的主要死亡原因爲急性腸炎及急性傳染病。民國四十一年流行瘧疾，經農復會協助省衞生處展開全面噴射ＤＤＴ，並進行治療及改善環境衞生等工作，終能予以有效控制。五十四年十二月，世界衞生組織宣佈瘧疾已在我國根除。

另如狂犬病，雖經積極推動家犬登記及預防注射，但因免疫有效期過短而無法完全撲滅。農復會於四十六年起協助省衞生處等機關辦理狂犬病防治工作，自國外引進鷄胚胎活性疫苗，三年內完成家犬全面預防注射，其免疫期間長達三年之久，四十八起卽未再發現病例。他如天花、霍亂、鼠疫等亦經積極協助防治而告絕跡，白喉、砂眼、性病、血絲蟲病及肺結核病例則有顯著減少，使國民平均壽命得以延長。

臺灣地區的人口成長

（千分比）

Population Growth in Taiwan

(Rate in Per Thousand)

時期 Period	每時期年底人口 Pop. at end of period (thousand)	指數 Index (1946=100)	平均 Average 粗出生率 CBR	粗死亡率 CDR	自然增加率 NIR
1946-1950	7,554	124	40.91	14.28	26.63
1951-1955	9,078	149	46.35	9.53	36.82
1956-1960	10,792	177	41.72	7.65	34.07
1961-1965	12,628	207	35.83	6.10	29.73
1966-1970	14,676	241	29.04	5.27	23.77
1971-1975	16,150	265	24.00	4.72	19.26
1971	14,995	246	25.64	4.78	20.86
1972	15,289	251	24.16	4.72	19.44
1973	15,565	256	23.78	4.76	19.02
1974	15,852	260	23.42	4.76	18.66
1975	16,150	265	22.98	4.69	18.29
1976	16,508	271	25.93	4.69	21.24
1977	16,813	276	23.76	4.76	18.30

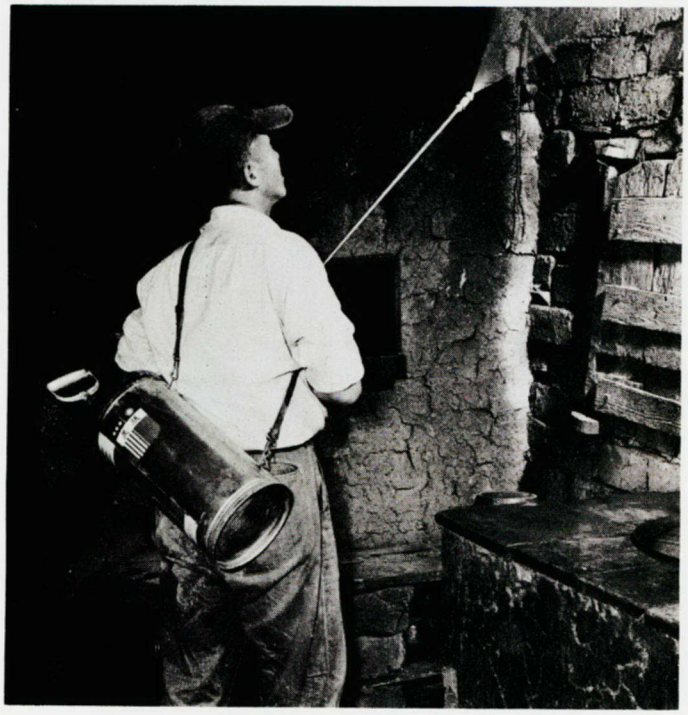
資料來源：內政部　Source: Ministry of the Interior

附　註：1. 五十八年起軍隊人口納入戶籍登記。
Notes　Figures cover military personnel after 1969.
2. 三十五年底總人口爲 6,090,860。
Total population at the end of 1946 was 6,090,860.

國民小學講授人口教育課程情形。
Teaching of population-related subjects at a primary school.

FAMILY PLANNING PROGRAM

Taiwan's population doubled from some six million in 1946 to over 12 million in 1964, averaging an annual growth rate of four percent. This shows the seriousness of the population problem here. In the absence of a government policy on population and at a time when mere mention of birth control was taboo, the late Dr. Chiang Monlin, former chairman of JCRR, single-handedly advocated and ushered in the family planning movement at the very start of JCRR's operation. Beginning in 1949, JCRR rendered technical and financial assistance to voluntary agencies and health organizations in distributing educational pamphlets and undertaking a fertility survey of married women. In 1954, with the establishment of the Family Planning Association of China, an intensive family planning education program was launched. JCRR managed to blend family planning into the government's maternal and child health work by coining for it the name "pre-pregnancy health care."



家戸ＤＤＴ噴射工作。
Household DDT spraying for malaria control.

In 1962, the family planning program began to receive financial and technical support from the Population Council of New York and the Michigan University, and later from the Pathfinder Fund through JCRR arrangements. A special project for introducing family planning to military recruits was started in 1966. All these years' efforts culminated in the promulgation by the Central Government of a set of "Regulations Governing the Implementation of Family Planning in Taiwan" in May 1968. Since then, family planning has become a regular public health service.

Presently, the crude birth rate has dropped to 23 per thousand and the natural increase rate to 19 per thousand. The significant decline of the natural increase rate has greatly contributed to socio-economic development in Taiwan. For the idea of family planning to take root among the younger generation, JCRR has since 1971 assisted related agencies in implementing a school population education program, which is aimed specifically at making young people aware of the benefits of small-size family and the need for planned parenthood.

CONTROL OF COMMUNICABLE DISEASES

In the late 1940's and early 1950's, the major causes of death in Taiwan were enteritis and acute infectious diseases. JCRR began to take part in the control of communicable diseases as early as 1952. There had been a severe outbreak of malaria, affecting more than 15% of the population. With JCRR and WHO assistance, an island-wide control program was put in motion. By means of household DDT spraying, case treatment, environmental sanitation improvement, etc., the disease was finally stamped out 14 years later. Taiwan was officially declared malaria free by WHO in 1965.

Rabies control was another example of JCRR endeavors. Before 1957, despite the government regulations requiring the registration and vaccination of dogs, there were recurrent rabies cases owing to the short immunity effect of the vaccine then in use. In 1957 JCRR introduced Flurry-Kelev avianized vaccine, which had an immunity period of three years, and assisted the health authorities to conduct compulsory vaccination of hogs. As a result, the disease was eradicated in 1959.

Due to the joint efforts of JCRR and government agencies concerned, other acute infectious diseases such as smallpox, cholera and the bubonic plague have also been wiped out, while the incidence of diphtheria, trachoma, V.D., filariasis and tuberculosis has been markedly brought down. This has been a major factor contributing to the increased life expectancy of the people.

國民營養的改善

臺灣光復以來，人口雖已增加一倍多，但糧食從不虞缺乏。三十年來，每人每日攝取的熱量由一、二七七卡增加至二、七九一卡，總蛋白質由二四公克增至七六公克。

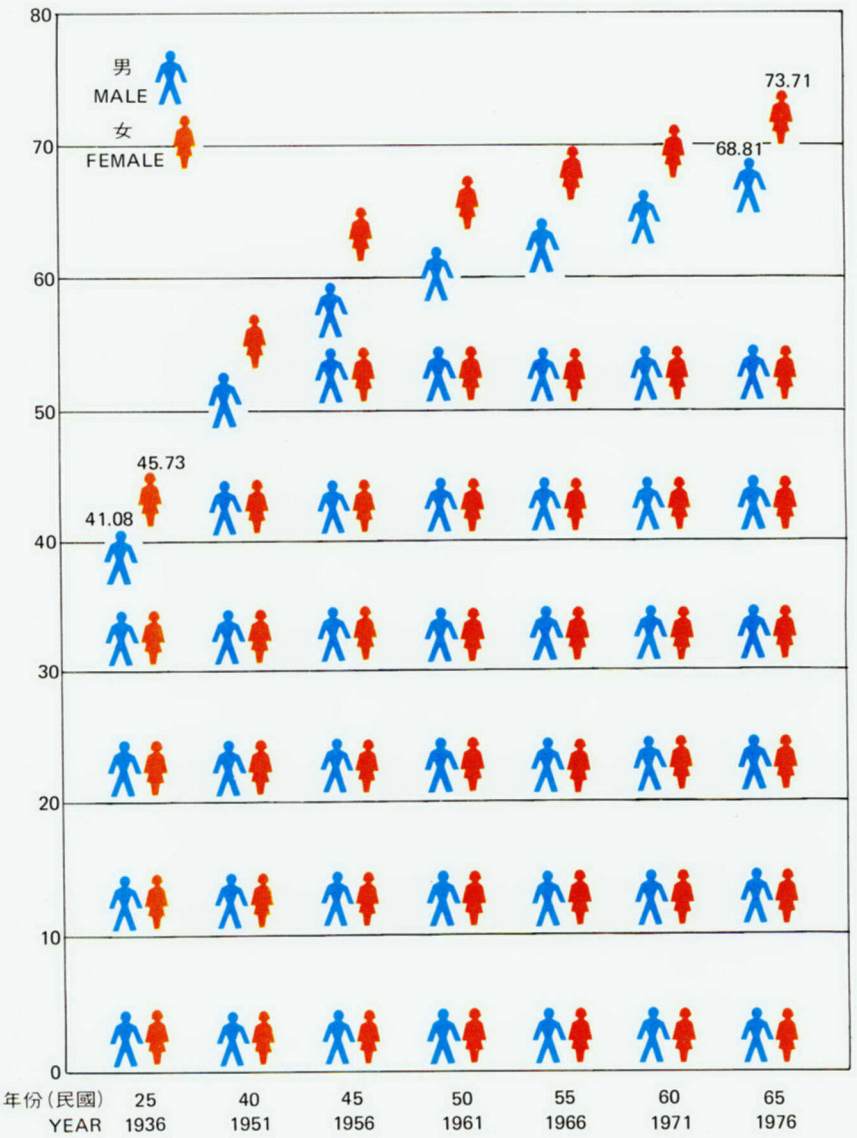
農復會鑒於兒童的營養直接影響到民族的強盛，四十八年特協助臺灣省教育廳創辦學校午餐計畫。最初在山地及偏僻地區實施，目前已推廣至全省各地四百餘所國小及國中，受益學生達二四〇、〇〇〇人。近年來由於經濟的不斷成長，糧食供應已更爲豐富，故在國民營養改善計畫項下協助推行營養教育，宣導如何選擇食物；期望人人吃得對，也吃得好。

加強食品衛生的管理

食品加工業與農業關係至爲密切，不僅可解決生產過剩問題，並可安定物價及提高農民所得。近年來加工食品在國際市場的競爭日趨激烈，爲提高我國產品的品質，加工過程中的衛生管理至爲重要。農復會於五十九年開始將醫院的消毒觀念與技術推廣應用於食品加工廠的衛生管理，派遣公共衛生護士駐在工廠協助實施員工個人及環境衛生訓練，促使工廠自行建立衛生管理制度。六十六年並協助行政院衛生署辦理臺灣地區食品衛生安全調查，以供訂立政策，推行食品衛生教育及輔導改善的參考。

台灣地區國民平均壽命（民國25～65年）

LIFE EXPECTENCY IN TAIWAN (1936-1976)



NUTRITION IMPROVEMENT PROGRAM

Much progress has been made in the nutrition improvement of the people during the past 30 years. Although Taiwan's population has more than doubled in the period, there has been no lack of food. In fact, the per capita daily food availability has increased from 1,277 calories to over 2,791 calories, and protein intake, from 24 grams to 76 grams.

In view of the importance of nutrition for children, JCRR in 1959 assisted the Taiwan Provincial Department of Education in launching a school lunch program. First started in aboriginal and remote areas, the program now covers more than 400 primary and secondary schools all over the island, benefiting about 240,000 children.

In recent years, with food supplies getting increasingly abundant, JCRR's nutrition program has been focusing on educating the people on how to choose the right kinds of food so that they will not only eat well but get a balanced diet at the same time.

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IMPROVEMENT OF FOOD HYGIENE IN FACTORIES

To raise the quality of processed agricultural products, JCRR in 1970 introduced the aseptic concept and sterilization techniques to food factories. Arrangements were also made for public health nurses to visit the factories to supervise their sanitation improvement and train their workers in personal hygiene. Meanwhile, the factories were encouraged to set up their own sanitation supervision systems.

In 1977, JCRR started cooperating with the National Health Administration in conducting a general food hygiene and safety survey. Results of this survey will serve as a guide in planning measures for further improvement of the food industry.

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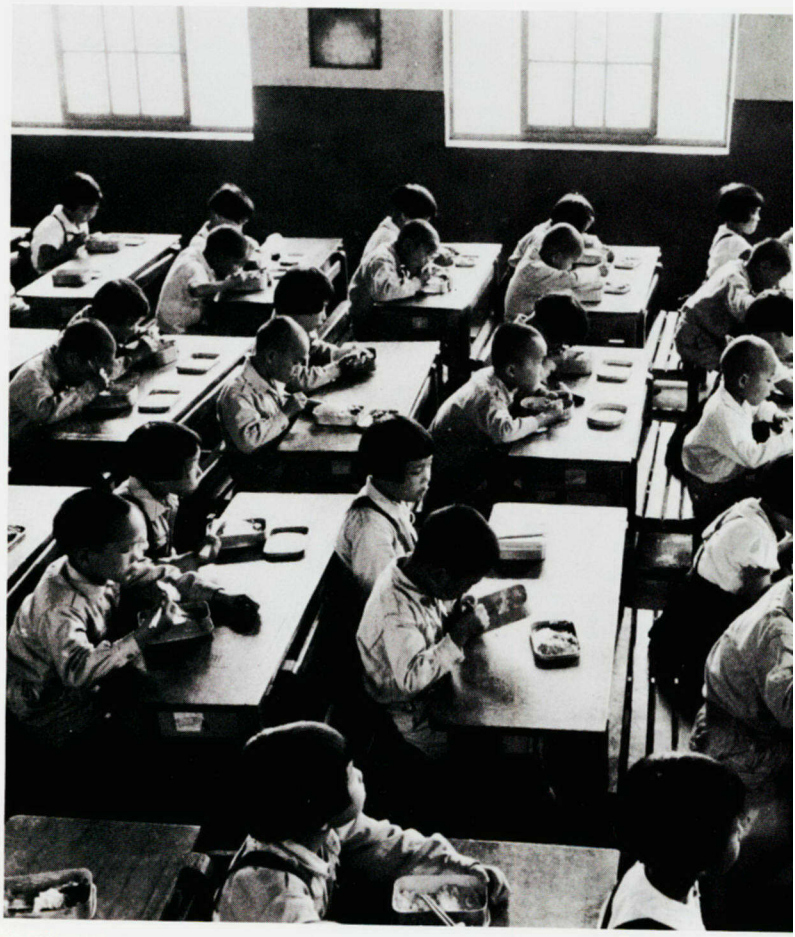


1. 瘧疾研究。
   Malaria research.
2. 國民小學學童享用營養午餐情形。
   Children having lunch supplied under the school lunch program.

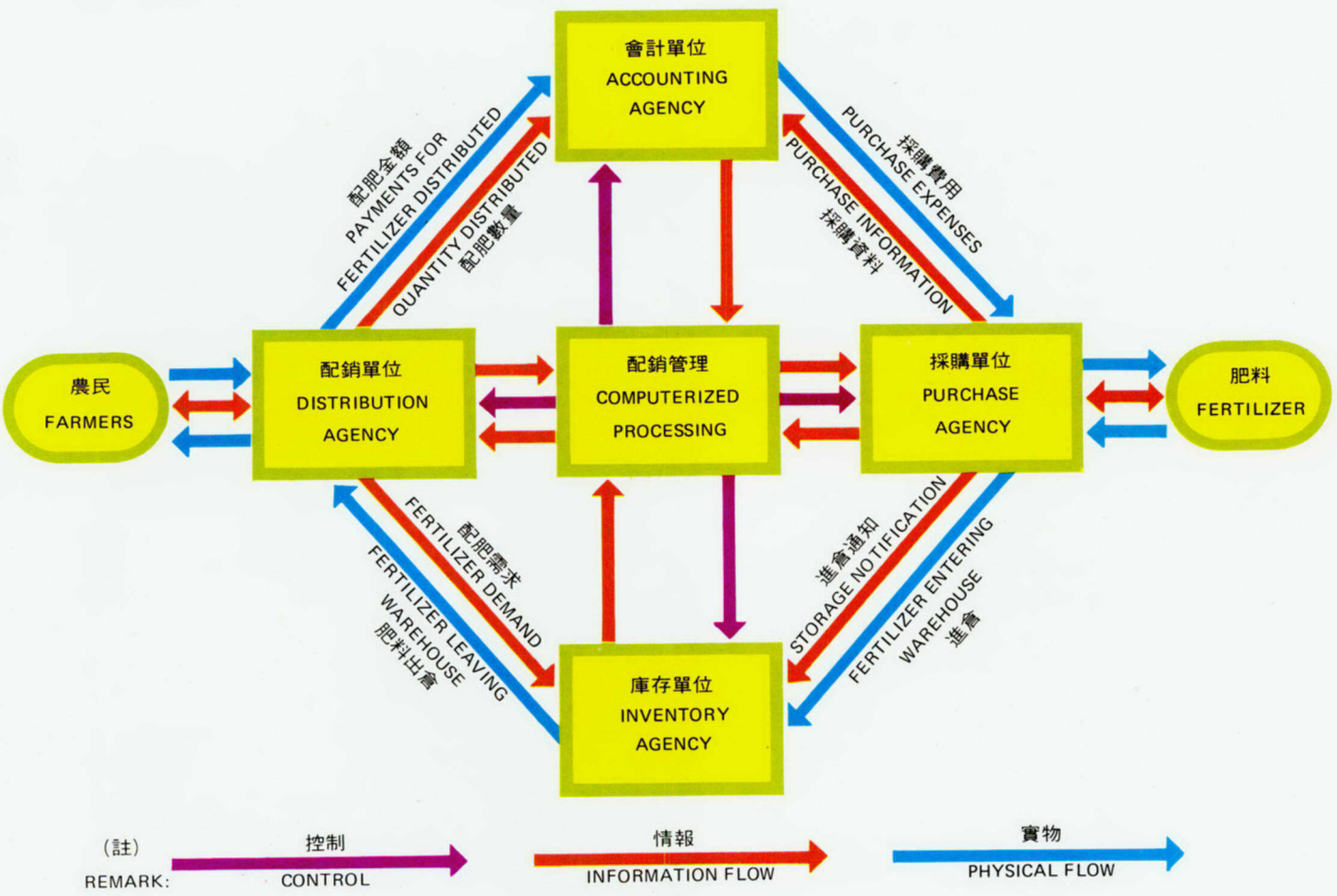
農產運銷

更新農產運銷設備，健全農產運銷制度及提高運銷業務的效率，爲農復會協助農業生產者組織改進農產運銷的三大目標。經過多年的努力，農民已可從產品的銷售中獲得較爲合理的收益，而近十數年來農產品外銷金額的增加及外銷項目雜異程度的提高，對於改善臺灣農家經營結構及促進農產商品化，亦有相當助益。

近三十年來，臺灣農業生產的客觀條件及農產品國內外市場的需要都有顯著的變化，農產運銷制度及效率的改進重點，也因時、地及產品的種類而異。大體言之，三十八年至五十年爲第一階段，着重於協助農民組織改善與擴充其運銷基本設備，增加農產品倉儲及加工的數量，減少人力與物力的損耗。五十一年起的十年間爲第二階段，重點爲創導農產品契約生產與農民分享運銷利潤制度，保障生產者的合理收入。六十一年迄今爲第三階段，以加强辦理農產品共同運銷、提高運銷功能、縮減運銷差距爲主要工作。

肥料電腦配銷管理系統

COMPUTERIZED FERTILIZER DISTRIBUTION & MANAGEMENT SYSTEM



Agricultural Marketing

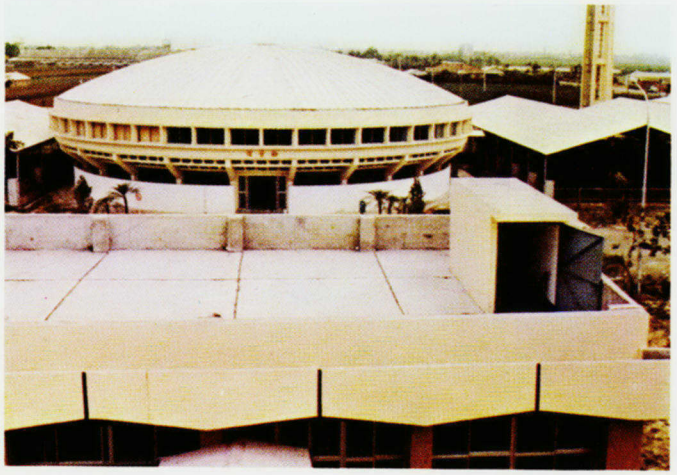
Through the efforts of JCRR and other agencies and organizations concerned, considerable improvement has been made in the past in Taiwan's agricultural marketing system. The farmers, as a result, are now able to enjoy a more reasonable profit from the sale of their produce. The expansion and diversification of agricultural exports have also promoted farm management improvement and commercialization of agricultural production.

During the past three decades, significant changes have occurred in the conditions of agircultural production in Taiwan and in the demand situations both at home and abroad. Emphasis in agricultural marketing improvement has therefore varied with the changing requirements of the times.

By and large, in the period from 1949 to 1961, efforts were made mainly to renovate and expand the basic marketing facilities of farmers' organizations, so as to increase their storage and processing capacity and to reduce waste in manpower and material. In the decade that followed, the stress was on the institution of contract farming and profit sharing systems to guarantee a reasonable income for the producer. Since 1972, attention has been paid chiefly to the strengthening of cooperative marketing in order to narrow the gap between the farm price and the market price.

1. 嘉義縣朴子鎮家畜市場外貌。
   Outside view of the Putzu Livestock Market.

2. 嘉義縣朴子鎮家畜市場擁有電子拍賣機及電腦設備。
   The Putzu Livestock Market is equipped with electronic auction and computer data processing facilities.



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改善與擴充運銷基本設備

臺灣光復初期，鄉鎮農會各種倉儲設備破舊不堪，不足以因應農業不斷增產的需要。經採取經費三對等方式，由農復會、糧食局及接受補助農會各負擔三分之一的經費，修繕並興建稻谷、肥料與種子倉庫，凡屬貧窮地區農會，且可獲得全額補助。至六十五年底，各地農會在這種補助方式下建造倉庫的總倉容量達已六十萬公噸。

近年來鑒於覓購倉庫用地困難及地價日趨昂貴，改爲倡導興建集中式大型倉庫，既便於管理，又可藉自動裝卸設備而降低成本。此外，協助糧食局建立肥料配銷及稻穀倉儲資料電腦處理制度，可大幅節省人工及費用。

鄉鎮農會多附設碾米廠，接受政府委託代辦稻谷加工。農復會在臺灣光復初期即開始補助鄉鎮農會陸續全面更新碾谷設備，使平均碾率（即所謂步留）由七六%提高到八〇%。如以每年代碾公糧糙米六十萬至七十萬公噸計算，減少損失可達二萬四千公噸以上。

臺灣農家的生產規模細小零碎，不能成爲合乎經濟條件的運銷單位，經補助臺灣區青果運銷合作社興建外銷香蕉、柑桔及其他水果的集貨包裝場，並購置柑桔自動塗臘機等設備，以提高合作運銷的作業效率，減少果農個別銷售產品所遭遇的困難。

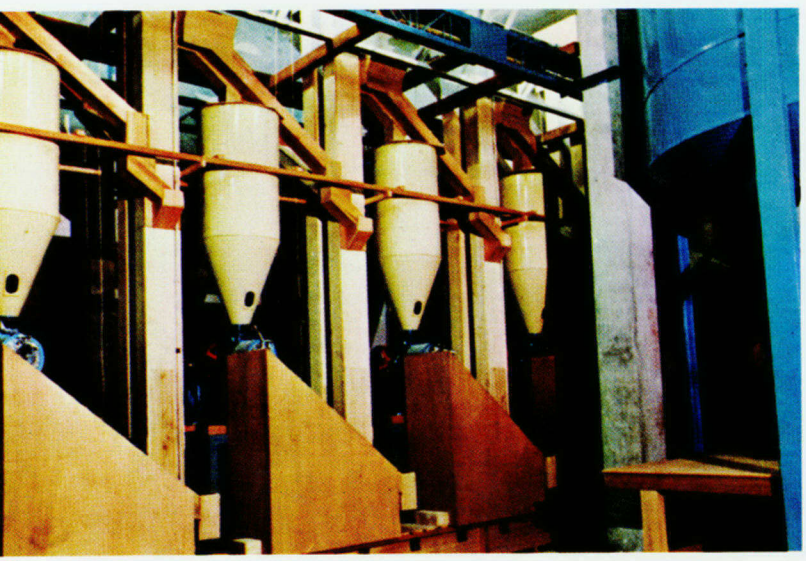
鑒於青果、蔬菜與毛豬的交易數量急速增加，特補助地方政府及農會新建或擴建果菜、毛豬的產地集貨市場，與消費地批發市場，使多數農民得以同時在同一市場出售產品，增加議價力量。補助家畜市場安裝的電子拍賣設備，對於毛豬合理價格的形成尤有幫助。

倡導契約生產與利潤分享制度

臺灣主要外銷作物的價格常因供應量過多或過少而有暴跌暴漲情形，農民與加工廠商兩蒙其害，產銷事業無法穩定。農復會於五十年起先後建議及協助有關機關建立外銷作物契約生產與利潤分享制度。實施計畫生產，並分別提存平準基金或安定基金，以保障農民利益。六十六年外銷蘆筍罐頭原料收購價格原訂爲每公斤新臺幣二十元，根據上述制度，筍農所供應的原料，每公斤尚可另獲〇・六一元的利潤。六十六～六十七年期外銷洋蔥的最低保證價格爲每袋（廿公斤）四十五元，將分配利潤計入後蔥農所獲價款可達九十元。

加強毛豬蔬菜共同運銷

個別養豬與種菜農戶對市場價格變動不甚熟悉，且因供應數量有限，在交易過程中全無爭議力量。農復會近年會同有關機關輔導農會加强辦理毛豬與蔬菜共同運銷，已獲良好績效。六十六年透過農會共同運銷供應國內市場的毛豬達三十五萬頭，較十年前增加三倍以上。蔬菜共同運銷於六十二年六月創辦，目前每日平均供應臺北批發市場約一二〇公噸，市場佔有率達四分之一。共同運銷係由農會辦理集貨，直接供應消費地批發市場，節省甚多中間費用，間接增加農民收益。



集中型稻谷倉庫附設大規模稻谷加工設備，以提高作業效率。
All centralized rice warehouses are provided with milling facilities to upgrade their operating efficiency.

農會以共同運銷方式將小農戶所生產的肉豬運往市場出售，以節省各項費用。
Hogs raised by small farmers waiting to be shipped to the market through the FA joint marketing system.

RENOVATION AND EXPANSION OF BASIC MARKETING FACILITIES

Since the early 1950's, a program for the repair and construction of rice, fertilizer and seed warehouses has been implemented, with JCRR, the Taiwan Food Bureau and the township farmers' association (FA) concerned each sharing one-third of the cost. As of the end of 1976, the aggregate storage capacity of all the FA warehouses thus constructed reached about 600,000 metric tons. In recent years, because of the increasing difficulty of acquiring cheap building land, JCRR has been promoting the construction of large centralized warehouses. Godowns of this type are easier to manage and their storage costs can be reduced with the use of automatic loading and unloading equipment. With JCRR assistance, TFB has also established a computerized system each for fertilizer distribution and rice collection. The former is now practiced island-wide.

Practically all the farmers' associations own rice mills and are entrusted with the task of procesisng rice for the government. As a result of JCRR's assistance to township FAs in renewing their milling facilities, the average recovery ratio of brown rice from paddy has been raised from 76 percent to about 80 percent. Calculated on he basis of 600,000-700,000 metric tons of government rice milled each year, the improved recovery ratio means an annual saving of about 24,000 metric tons of brown rice, which would otherwise be wasted.

Because of their small farming scale, Taiwan farmers individually are not economical marketing units. JCRR has assisted the Taiwan Provincial Fruit Marketing Cooperative in building packing houses for export bananas, oranges and other fruits and installing automatic orange waxing machines, etc., so as to promote and raise the efficiency of cooperative marketing by the small growers.

In view of the rapidly increasing volumes of transactions in fruits, vegetables and hogs, JCRR assistance has been rendered to local governments and farmers associations to construct or expand assembly markets and terminal markets in producing areas and consumption areas, respectively. Centralized selling in these markets has given the farmers a stronger bargaining power. The installation of electronic auction facilities in livestock markets has made it possible for hog farmers to obtain more reasonable prices for their animals.

CONTRACT FARMING AND PROFIT SHARING SYSTEMS

Due mainly to unstable market supply, Taiwan's major export farm products are subject to excessive price fluctuations which often cause financial loss to the farmers and the processing firms alike. To ameliorate this situation, systems of contract farming and profit sharing for export crops have been instituted with JCRR assistance since 1961. These systems provide for planned production to ensure adequate supplies of raw materials for the processing plants and establishment of stabilization funds to safeguard the farmers' economic interests.

STRENGTHENING OF COOPERATIVE MARKETING OF HOGS AND VEGETABLES

In recent years, with the assistance of JCRR and related agencies, great strides have been made by FAs in strengthening their cooperative marketing programs for hogs and vegetables.

In 1977, hogs shipped to the domestic markets through the FA cooperative marketing system totaled 350,000 head, a triple increase from 10 years ago. The vegetable cooperative marketing system, initiated in June 1973, now delivers about 120 metric tons daily to the terminal market in Taipei, enjoying a market share of about 25 percent. Under the cooperative marketing scheme, farm products are collected and directly shipped to the consumption markets by the FAs. By so doing, considerable intermediate cost can be saved to increase the income of farmers.

設置於一主要產地的果菜集貨市場。

An assembly market for fruits and vegetables in a major producing area.

建立市場行情報導系統

六十三年七月，農復會協助中央及省市政府建立農產品行情報導系統。在各重要農產品批發市場設立行情報導站，每日收集當地青果、蔬菜、毛猪、魚類、家禽與蛋類的交易資料，利用閉路電傳打字設備傳至其他報導站，使農會及農民能迅速掌握市場行情變動的時機，決定最有利的運銷計畫。農產品市場行情報導系統創立初期，僅設有一個中心及八個報導站，目前已擴增爲十二個報導站。臺灣重要農產品的產地與消費地都納入此一市場行情報導網。

推動設置青年商店

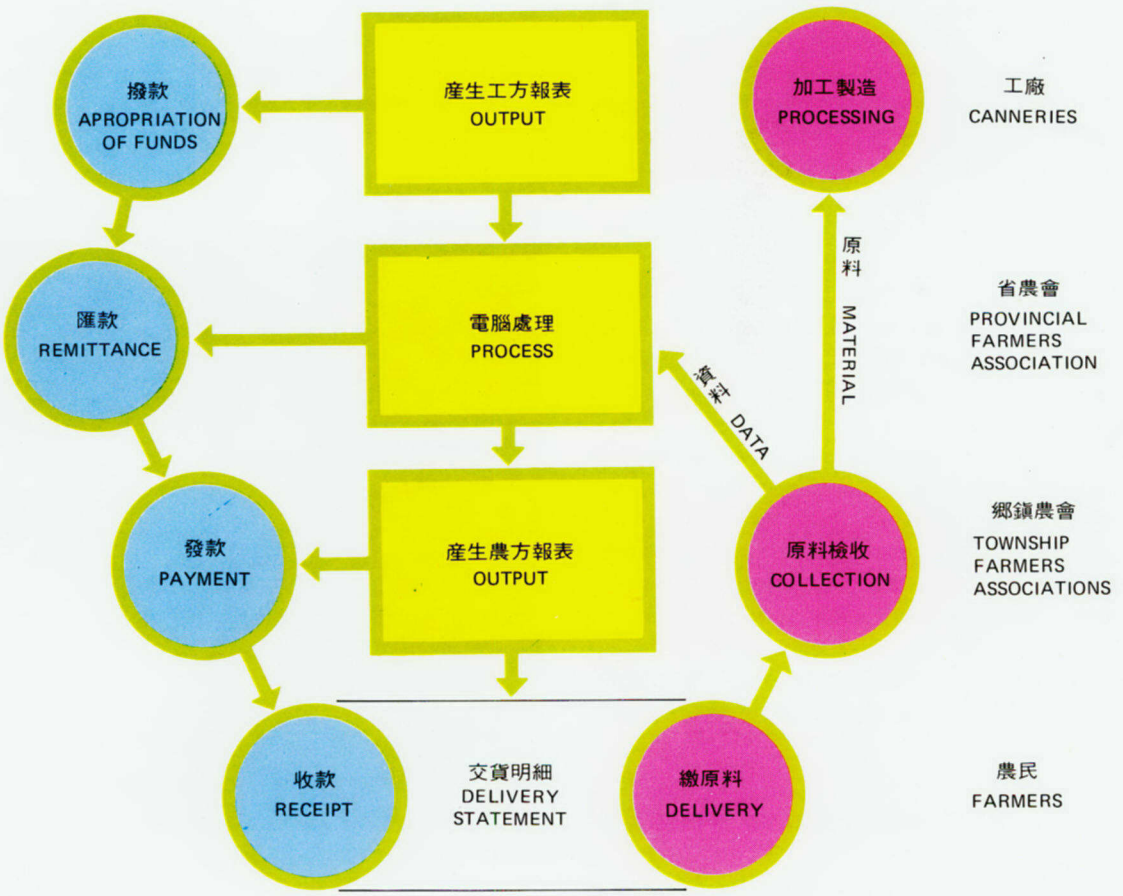
臺灣地區的食品零售業規模細小，向爲農產品運銷系統中效率最低的一環。農復會自六十六年起會同行政院青年輔導委員會協助臺北市政府試辦具有超級市場優點的青年商店。此項計畫一方面幫助青年創業，一方面爲消費者提供衞生、舒適、貨色齊全而價廉物美的食品購買場所，現正陸續擴大試辦中。預定於六十七年底前在臺北市開設一百家青年商店，作爲食品零售業經營現代化的示範。

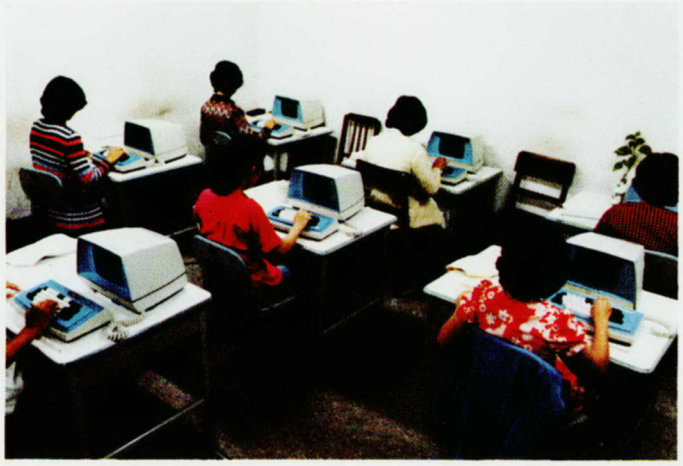
改進集貨付款資料處理

在各種農產品運銷數量日趨龐大，貨款計算逐漸繁雜的情況下，彙計處理運銷業務資料，須能配合改進。六十二年七月，農復會首先協助臺灣省農會採用電腦處理外銷洋菇與蘆筍原料檢驗收購資料，正確而迅速完成一百餘家罐頭工廠與一萬餘戶農民交貨付款的計算工作。臺灣區青果運銷合作社及臺灣省糧食局，在農復會協助下已採用電腦進行外銷香蕉貨款結算及公糧的收撥作業。

洋菇蘆筍電算作業系統

COMPUTERIZED MARKETING SYSTEM FOR MUSHROOMS & ASPARAGUS





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ESTABLISHMENT OF MARKET INFORMATION SYSTEM

In July 1974, a market information system for agricultural commodities was established with JCRR assistance. The system consists of a information center and a reporting station each in 12 major wholesale markets. Each station collects daily transaction data on fruits, vegetables, hogs, fish, poultry and eggs and transmits such data through a closed-circuit teletypewriter to all other stations simultaneously. This system enables the FAs and farmers to quickly take advantage of the market price changes and make opportune plans for harvesting and marketing.

PROMOTION OF YOUTH CONVENIENCE STORES

Food retailing in Taiwan is conducted by tens of thousands of small businesses in a disorganized and scattered way; it constitutes the weakest link in the agricultural marketing chain. To help improve the efficiency of food retailing, JCRR, in cooperation with the Youth Guidance Commission of the Executive Yuan and the Taipei Municipal Government, started in 1977 a pilot project for helping selected youths to set up supermarket-type convenience stores in Taipei for demonstration purposes. With emphasis on sanitation, modern management and customer service, the stores supply a wide range of foods and other goods at reasonable prices. By the end of 1978, the number of such stores is expected to reach 100.

COMPUTER PROCESSING OF MARKETING DATA

With rapid expansion of the volume of farm products marketed off-farm, the accounting procedures involved in making payments to farmers have become increasingly complex. In July 1973, JCRR assisted the Taiwan Provincial Farmers' Association in introducing computer application to the processing of data on mushrooms and asparagus collected for export canning. This has greatly simplified and speeded the settlement of accounts with more than 10,000 growers by over 100 canneries. The Taiwan Provincial Fruit Marketing Cooperative and the Provincial Food Bureau now also use computers in processing payments for bananas collected for export and for rice collected in the government's behalf.

1. 台灣省農會電腦中心資料輸入系統。
   Operators at work in the data entry unit of the PFA Computer Center.

2. 行情報導站收集各地主要農產品行情。
   One of the market information reporting stations.

3. 一家青年商店的內部陳設。
   Inside view of a youth convenience store.

農業經濟調查與研究

農復會對於農業統計資料的蒐集及農業經濟的研究甚爲重視。在統計資料方面注重制度的建立，運用系統方法蒐集有關資料。在經濟研究方面則爲理論與實際並重，特別注意發掘經濟發展過程中所遭遇的各種問題。

農業年報

臺灣農業年報爲臺灣農業最基本的一份統計資料，對歷年農林漁牧的生產都有詳細報導。民國三十七及三十八年，因臺灣省政府經費短絀，農業年報連續兩年無法如期出版。經於三十九年起資助農林廳按期編印，並補印三十七及三十八年兩期，以保持資料時序的完整，爲以後的農業統計建立了良好基礎。

農產價格及成本調查

農復會自民國五十二年起，協助農林廳蒐集農產價格情報，並以旬報及月報方式定期發表，供政府有關單位及農民參考。目前納入報導的產品項目已達一百八十餘種。

在成本方面，最先僅作不定期及主要作物的調查，後鑒於此一資料對估量國民所得及編製產業關聯表與農業生產指數的重要性，五十八年開始與經合會聯合補助農林廳每年舉辦一次調查。調查項目逐年增加，調查方法亦有改進，每年並將調查結果編印「臺灣農產物生產成本調查報告」，供各方參考。經過五年的努力，已大致建立調查制度的基礎，自六十三年起，全部工作即由農林廳負責辦理。

農家所得調查

農家所得爲衡量農民生活水準及農業發展成果的良好指標，亦爲制定農業政策的重要參考資料。農復會自民國四十一年起與國立臺灣大學及中興大學合作，每五年辦理一次農家所得抽樣調查。歷次樣本戶數不同，調查內容亦略有變動。主要調查項目包括農家所得的來源、支出的變動、生產成本及影響收支的各種主要因素。所獲調查結果，分別以中英文彙編刊印，因內容較其他來源翔實可靠，甚得各方重視。

農家記賬工作

農家記賬工作由農復會提倡，於民國四十二年開始實施，首先與農林廳、教育廳及臺灣省立農學院等單位合作，在宜蘭、桃園、苗栗、臺中、員林、嘉義、臺南、臺東及花蓮等十所省立高級農業職業學校試驗推行，鼓勵學生志願協助家長記賬，每校聘請教師一至二位負責指導。四十四年秋，改由農林廳主辦。

四十九年起改變記賬方式，以鄉鎮農會爲中心，由農事或四健會指導員指導農民記賬。記賬資料經農林廳整理分析後送還農家，作爲經營改善的參考。爲配合農情報導制度的實施，記賬工作自六十一年起再改由鄉鎮公所負責推動。每年農林廳將全省資料編印「臺灣省農家記賬報告」，供有關單位參考，對農家經濟的分析及政策的制定，都有很大幫助。

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1. 甘藍爲菜農的一項主要所得來源。
   Cabbages are a major source of income for vegetable farmers.
2. 歷次編印的農業普查報告。
   Agricultural census reports published over the past years.
3. 農事指導員向農民講解記帳方法。
   Farmers learning how to keep farm records from an extension worker.
4. 農事指導員在農家指導農民記帳。
   An extension worker checking the records kept by a farmer at the latter's home.

Agricultural Statistics and Economic Research

JCRR pays close attention to the collection of agricultural statistical data and agricultural economic research, with emphasis on the establishment of statistical systems and application of economic theories to the solution of farm problems that arise during the course of economic development.

TAIWAN AGRICULTURAL YEARBOOK

The Taiwan Agricultural Yearbook, an important source of basic agricultural statistics, is compiled and published by the Provincial Department of Agriculture and Forestry (PDAF). In 1948 and 1949 PDAF was unable to bring out the yearbook owing to financial difficulties. In order to keep up the time sequence of data, JCRR made a subsidy to PDAF in 1950 not only to publish the yearbook for the year but also to print the two overdue editions. Since then the yearbook has been published on time with continued JCRR financial and technical assistance.

AGRICULTURAL PRICE REPORTING AND COST SURVEYS

Since 1963 JCRR has been assisting PDAF in collecting price information on agricultural products and publishing it once every 10 days and also on a monthly basis for the reference of both producers and consumers as well as the government agencies concerned. At present, this reporting service covers the prices of 180 items.

Formerly, surveys on the production cost of major crops were conducted only occasionally. In view of the importance of cost data in compiling national income statistics, input-output tables and agricultural production indices, JCRR and the Council for International Economic Cooperation and Development (CIECD) began providing financial assistance to PDAF in 1969 for making a production cost survey once every year. With the survey system well established after five years, the joint support was discontinued in 1974.

FARM INCOME SURVEY

Farm income is a good indicator of farmers' standard of living and serves as a yardstick for evaluating agricultural development efforts. Since 1952, JCRR has cooperated with the National Taiwan University and the National Chung Hsing University in conducting, at five-year intervals, a series of sample income surveys covering such items as source of income, change in expenditure, production cost and major factors affecting income and expenditure. The survey results, published in both Chinese and English, have been widely distributed.

FARM RECORD KEEPING PROGRAM

The farm record keeping program, initiated by JCRR in 1953, was first carried out on an experimental basis at 10 selected senior vocational agricultural schools, where the students were encouraged to help their parents keep daily records of the operations of their family farms. PDAF assumed responsibility for the program in 1955.

A procedural change effected in 1960 shifted the hub of work from V-Ag schools to township farmers' associations, and since 1972, for better coordination with the agricultural reporting system, the program has been sponsored by township offices. The farmers now keep their records with the assistance of farm extension workers or 4-H club advisers of the local FAs. The records of each farm are sent to PDAF for analysis, and the results are then returned to the farmers for reference in improving their management practices. A report on the program is published annually by PDAF to serve as a guide to agricultural agencies in planning farm policies.

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農業普查

農業普查爲基本國勢調查的一種，目的在蒐集有關農業的各種資料以爲經濟建設的參考。此種調查在歐美各國已行之有年，我國至四十五年始由農復會協助政府首次舉辦五%選樣普查。全面性的農業普查於五十年舉行，以後每十年舉行一次，在兩次全面普查之間並舉辦一次選樣普查。農業普查工作現由行政院臺閩地區農漁業普查委員會專責辦理，農復會專家仍參與設計工作。

糧食平衡表

民國四十五年六月，農復會出版「臺灣糧食平衡表」一册，爲臺灣首次對糧食生產與消費所作的全面性系統分析。

製作糧食平衡表的目的在於瞭解糧食供需及一般消費情形，內容包括糧食生產、可供利用數量、每人平均消費量、每人每日吸收熱量及主要營養素的數量等資料，可反映臺灣地區人民的生活水準，並爲政府擬定糧食政策的參考。

農業資料檔案的建立

臺灣各農業有關機關發行的各種農業統計資料，分散各處，使用極爲不便。爲便於研究及供爲擬制農業政策的參考，農復會已進行將重要農業資料有系統的儲存於電腦中，目前已存入電腦的資料包括農業產出、農產品生產成本、農業人口及勞力、農產品貿易與農家收支資料等項。

農復會前農業經濟組組長謝森中向來我國考察的韓國農業官員說明農業普查的方法與程序。

Dr. S. C. Hsieh, a former chief of JCRR's Rural Economics Division, explaining the methods and procedure of agricultural census to a group of Korean visitors.

臺灣地區人民營養水準的變動

Changes in People's Nutrition Level

年度 Year	熱量 Energy (卡 Calorie)	蛋白質 Protein (公克 gm)	脂肪 Fat (公克 gm)	碳水化合物 Carbohydrates (公克 gm)
1945	1,276.69	24.31	11.01	267.97
50	2,056.99	45.79	27.87	400.91
55	2,218.42	53.15	37.17	411.73
60	2,360.77	57.13	40.85	435.41
65	2,380.51	61.20	46.66	423.57
70	2,624.93	72.17	63.52	438.51
75	2,671.71	74.70	67.51	440.39
76	2,770.50	75.90	73.39	434.57
77	2,791.95	76.40	76.17	436.67

農業經濟研究

民國三十九年以前爲戰後經濟復原的時期，農業經濟研究着重於生產力的分析；又因當時人口快速增加，因此同時注意對糧食生產與糧價變動問題的探討。

民國四十年至四十九年爲農業加速發展的時期，此一階段的經濟研究强調生產因素——特別是人力及土地資源 — 的有效利用。同時爲配合新式投入的使用及生產技術的改進，對各種因素的經濟效益亦分別進行研究。由於本階段中農業對經濟發展有甚大的貢獻，農復會特別致力於臺灣農業發展理論與實際的研究分析，並試編完成農業部門與其他部門的關聯表。今天這種產業關聯表已成爲從事經濟設計的一種重要工具。

民國四十九年至五十七年，農業繼續成長，商業化程度逐漸提高。此段時期中的經濟研究可分爲二類，一爲利用投入產出的模式分析過去發展的經驗，另一方面則特別注意對農產品市場及價格的研究，並將研究成果編印「農復會經濟叢書」，供政府及學術界參考。由於農村勞動力已有外移的現象，故定期舉辦有關調查研究，以便能掌握勞動力的動向。

民國五十七年以後，快速的工業發展將臺灣經濟帶入一個新的境界。與工業部門相較，農業成長比較緩慢，勞動力亦漸感缺乏，因此經濟結構的改變成爲經濟研究的重點。同時爲應付各種因結構改變而引起的問題，開始從事個案研究。至目前爲止，各種專案研究報告包括農產品的供需預測，農業措施的評估，區域農業發展的分析以及農家所得水準與分配問題的探討等，已達九十餘種。

AGRICULTURAL CENSUS

To secure information on changes in agriculture and agricultural resources for economic planning purposes, the first census of agriculture in Taiwan was undertaken in 1956 with JCRR assistance on a 5 percent sample basis. It was followed by a complete census in 1961. Since then sample censuses and complete censuses have been alternately conducted once every five years. At present, the census work is handled by the Agricultural and Fishery Census Committee of the Executive Yuan, but JCRR specialists continue to take part in its planning.

PREPARATION OF FOOD BALANCE SHEET

In June 1956, JCRR published the "Taiwan Food Balance Sheet, 1935-1954." It was the first of its kind in Taiwan, containing information on food production, available supply, per capita consumption, daily energy intake, etc. Since then, food balance sheets have been prepared by JCRR annually to show changes in people's consumption pattern and improvements in the general standard of living.

農復會資料處理中心。· JCRR's data processing center.

農復會出版的經濟叢書。

Reports published by JCRR in its Economic Digest Series.

COMPUTER STORAGE OF AGRICULTURAL DATA

In the past, a large variety of statistical data have been published by various agricultural agencies. Because these data are widely scattered, it is difficult to get at and make use of them as in research and economic planning. JCRR has undertaken to have all essential data stored in the computer so that they can be readily available when needed. Already stored are data on agricultural output, production cost, farm population and labor, agricultural trade, farm family income and expenditure, etc.

AGRICULTURAL ECONOMIC RESEARCH

In the postwar rehabilitation period of 1945-1950, agricultural research laid emphasis on the analysis of farm productivity. Because of rapid population increase, attention was also paid to the problems of food supply and price stabilization.

The 10 years between 1951 and 1960 was a period of accelerated growth for agriculture. Research was undertaken mainly to see how better use of labor and land could be achieved and to ascertain the economic benefits of the many modern inputs and technical innovations introduced during this period. In view of the important contribution agriculture had made to overall economic development, some efforts were also devoted to studies of agricultural development theories and their application. To illustrate the inter-relationship between agricultural and other economic sectors, an intersectoral relationship table was compiled. This kind of table is now used as a major tool in economic planning.

Taiwan's agriculture continued to advance and became more commercialized in the 1960's. Economic research in this period centered on analysis of the past development experience by using the input-output model and study of markets and prices of farm products. Many research reports were published by JCRR in its "Economic Digest Series," which drew wide attention from both academic and government circles. As the outmigration of rural labor was beginning to gain momentum, surveys and analyses were conducted periodically in order to understand the situation.

After 1969, rapid industrial expansion has brought Taiwan's economy into a new phase of development. Compared with the industrial sector, the pace of agricultural growth has slowed down with rural labor in increasingly short supply. This structural change of the economy and its ramifications have therefore become the focus of economic research. To date, over 90 case studies have been made by JCRR economists on such subjects as commodity supply and demand, regional development planning, and farm income and distribution.

農會改進

民國四十二年，農復會建議政府將臺灣地區的農會改組爲農民所有、所享、所治的農民組織。在過去二十五年中，各級農會在政府主管機關及農復會的輔導下，已建立良好的財務基礎，逐漸步入企業經營的境界。這些農民團體不但承當了政府委託的公糧存儲、加工及化學肥料配發等龐雜業務，也爲近七十萬戶的臺灣農家提供信用、供銷和農業推廣的服務，被譽爲開發國家中最獨特、最成功的農民組織。

光復後臺灣農會的演進，大致可分爲三個時期：民國卅八年至四十二年，樹立健全制度；四十三年至五十八年，奠定營運基礎；五十九年起，開始企業化經營。

樹立建全制度

民國卅五年四月，政府將日據時期的農業會區分爲農會與合作社兩種組織。卅八年，臺灣省政府接受農復會的建議再將農會與合作社合併，仍稱農會。翌年九月，農復會美籍顧問安德生博士應邀來臺灣考察，對農會的組織型態和業務改進提出多項積極性的建議，政府於四十一年八月頒行的「改進臺灣省各級農會暫行辦法」就是以安氏的主張作爲藍本。四十二年臺灣農會進行全面改組，鄉鎮（區）級農會以農民爲會員，非農民爲贊助會員；前者享有充份的選舉和被選舉權。後者無選舉權，以排除非農民操縱農會的弊害。會員代表大會選舉產生的理事會有「權」議決農會的業務方針，理事會遴選的總幹事則賦予按照業務方針執行計畫的「能」力，使農會眞正成爲農民所有、所享、所治的組織。

1. 農復會前自力企劃組(已撤銷)組長章之汶博士於三十九年考察台灣，促成農會與合作社的合併。

   Dr. C. W. Chang (center), chief of JCRR's Local Initiative Encouragement Division (now defunct), recommended amalgamation of farmers' associations and cooperatives after a visit to Taiwan in 1949.

2. 四十二年農會改組後舉行會員代表大會，圖示代表發言情形。

   An FA members' representatives meeting held following the reorganization of FAs in 1953.

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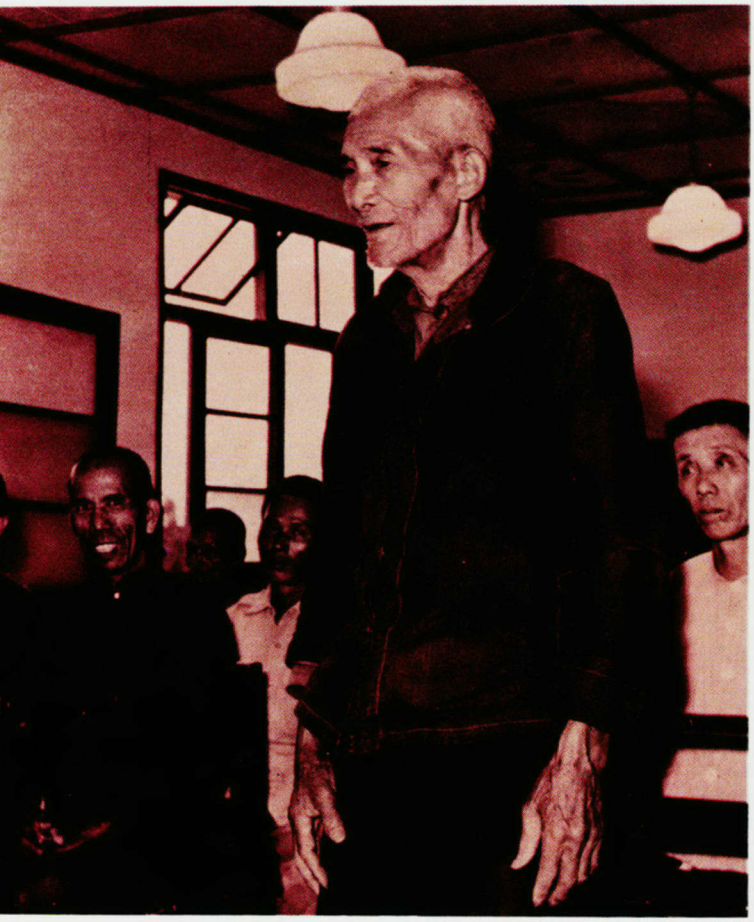
Farmers' Association

In 1953, on JCRR recommendation, the government reorganized the farmers' association (FA) in Taiwan into a true organization of the farmer, by the farmer and for the farmer. As a result of continued JCRR and government assistance in the past 25 years, the financial structure of FAs at all levels has been much improved and their operations have been put on a more businesslike basis. The FAs not only handle the storage and processing of rice and distribution of fertilizer for the government, but also render to some 700,000 farm families credit, marketing, supply, agricultural extension and other services. They are regarded as the most successful type of rural organization in the developing world.

The development of farmers' associations may be divided into three stages stressing, respectively, organizational improvement (1949-1953), strengthening of operational base (1954-1969), and modernization of business management (since 1970).

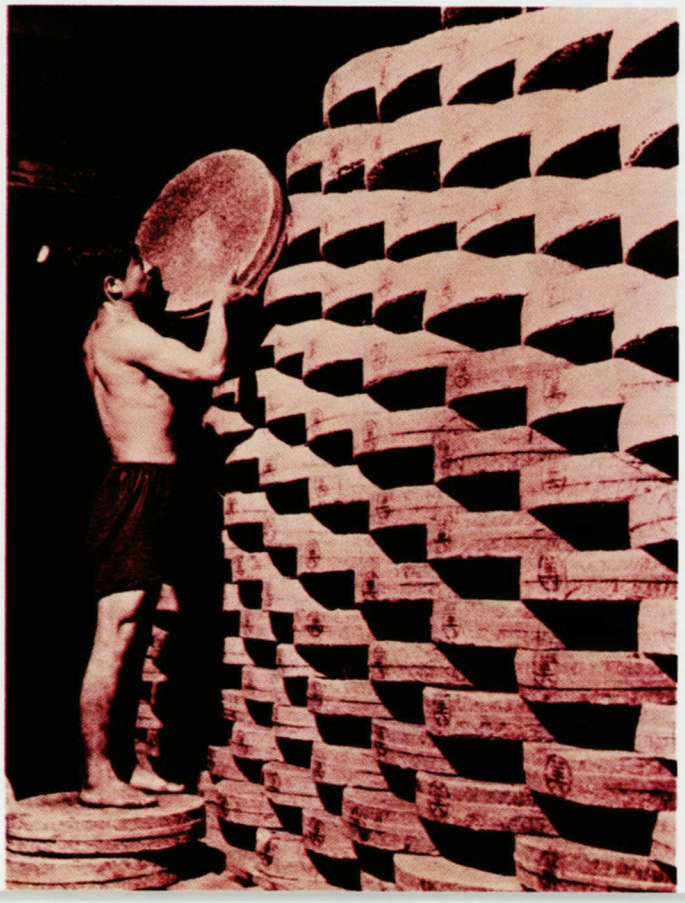
ORGANIZATIONAL IMPROVEMENT

In 1946, the government separated the "agricultural association" of the Japanese occupation period (1895-1945) into two different organizations, the farmers' association and the cooperative. Three years later, these two were again amalgamated into a single organization, the farmers association. In 1950, Dr. W. A. Anderson, a Cornell University professor and JCRR consultant, made a series of suggestions for improving the organization and operation of the farmers' associations, which were incorporated into the "Provisional By-laws Governing the Improvement of Farmers' Associations of Different Levels in Taiwan" promulgated in August 1952. The 1953 reorganization resulted in the classification of an association's members into two kinds: regular (farmer) members and associate (non-farmer) members. The former have the right to vote and be elected to office in the association. The latter have no right to vote, and this eliminates possible manipulation of the association by non-farmers. The board of directors elected by the members' assembly makes policies for the association, to be carried out by the general manager employed by the board.



農民副業養豬所需的豆餅由農會提供。

One of the services developed by the FAs after their reorganization was the supply of soybean cakes, a major ingredient of hog feed.



奠定營運基礎

在農會完成改組後，農復會支援臺灣省農會附設的農會人員講習所，辦理農會聘任職員的職前、在職訓練及選任職員訓練，並協助省農林廳編印「農會業務經營要覽」供農會員工參考。同時補助各級農會供銷部全面修建稻谷、肥料、種子與供銷貨品倉庫，更新碾米廠設備，以備承接政府委託代辦的公糧倉儲、加工與轉配化學肥料等項業務，所得手續費及加工費爲農會初期穩固財務基礎的主要收入來源。四十一年起，以補助部份薪津及業務費用的方式，鼓勵各級農會推廣單位相繼創辦四健會、農事與家政聯合推廣教育工作，向農村青少年、成年農民及農家主婦傳播新知識、新技術和新觀念。

四十四至四十七年，提供無息資金先後協助財務基礎較優的鄉鎮農會信用部試辦「示範農貸」及「輔導農貸」，改善農貸條件及培養農會承辦農貸業務的能力，以適合農民會員的需要。五十年起更獎勵鄉、鎮、區農會以農民會員存款總額七〇%配合農復會提供的無息資金，辦理「統一農貸」。農民基於增產與改進生活的需要，與農會在供銷及信用業務上建立密切關係，而農會則可藉經濟業務擴充後所產生的盈餘支援推廣教育的開支，逐步減少對農復會與政府補助款的依賴。

農復會農民輔導組組長楊玉昆陪同兩位前任組長菲平及維爾斯訪問台灣農村。

Y. K. Yang, chief of JCRR's Farmers Service Division, and his predecessors, W. H. Fippin (right) and P. W. Voltz, during the latter's nostalgic visit to rural areas of Taiwan.

STRENGTHENING OF OPERATIONAL BASE

Immediately following the 1953 FA reorganization, JCRR helped the Personnel Training Center of the Provincial Farmers' Association conduct pre-service and on-the-job training for FA employees and orientation sessions for elected FA officers, and assisted the Provincial Department of Agriculture and Forestry (PDAF) to compile and publish various FA operation manuals. JCRR financial support was also given to all FAs to repair and construct warehouses for rice, fertilizers, seeds and other commodities, and to renew their rice milling equipment. The fees which the FAs received for services rendered to the government were the major source of their operational funds at that time. From 1955 to 1958, JCRR made interest-free loans to selected FAs to carry out several experimental and demonstrative credit programs aiming to make more credit available on easy terms to farmers and strengthen the FAs' lending capability. A "Unified Agricultural Credit Program" started in 1962 has further improved the financial position of township FAs. Beginning in 1952, by subsidizing part of their personnel and operational expenses, JCRR helped the FAs at various levels to undertake agricultural extension education programs for rural youths, farm housewives and adult farmers. A close relationship has existed between the farmers and the FAs because of the former's need for economic and credit services to improve their production and livelihood. On the other hand, the FAs, through the expansion of their services, have been able to use the earnings therefrom to support the extension work, thereby gradually reducing their dependence on JCRR and government subsidies.

1. 參觀我國農會組織的外賓絡繹不絕。
   The FA system of Taiwan is a big attraction for foreign visitors.

2. 彰化縣芬園鄉農會辦公大樓。
   Office buildings of a township FA.

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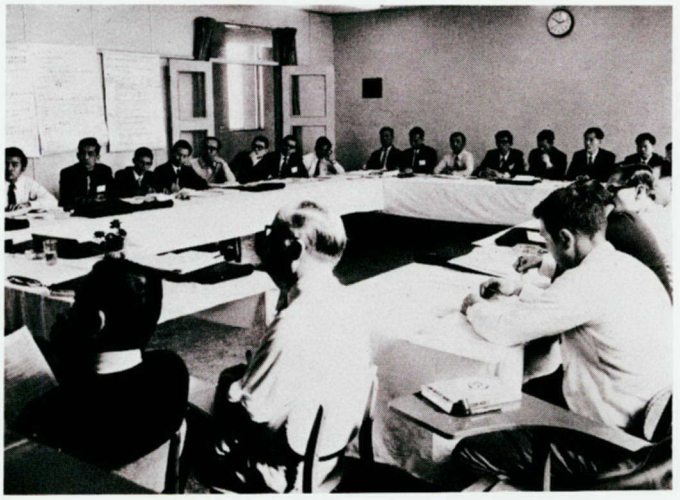
促進企業化經營

各級農會營運基礎逐漸穩固後，政府委託業務收入的比例相對下降，而供銷、信用業務的種類和規模則日趨龐雜，農復會對農會的輔導着重於培養人才、加强管理、改進業務及發展產銷聯營。先後推動人員精簡，舉辦管理研討會，訓練企劃專員，提高員工待遇，促進領導階層革新觀念，並建立新進人員考用制度。在發展產銷聯營方面，則擬棄原有的業務範圍分劃，於五十八年創議由省、縣及鄉鎮級農會組織飼料與農藥產銷聯營機構，逐步走上企業化經營的途徑。

目前臺灣地區共有兩個省、市農會，二十個縣、市農會及二八三個鄉、鎮、區農會。各地農會所擁有的倉庫可爲政府儲存稻谷一百一十萬公噸，肥料六十五萬公噸。農會的碾米廠，每天可代碾公糧三千八百公噸。農會在六十五年供應農民所需的生產資材及日用品，以及代辦毛猪、蔬菜、水果、洋菇、蘆筍及洋葱運銷，業務量高達新臺幣六十九億五千餘萬元。六十六年各級農會所聘用的農業推廣工作人員達一、二三一人，提撥的農業推廣與文化福利經費超過新臺幣四億三千三百餘萬元。農會在教育農民方面的功用，尤爲發展農業及建設農村所不可或缺的因素。



農會管理研討會。
An FA management workshop.

三級農會共同設置的飼料廠。
A feedmill jointly operated by FAs at all levels.

MODERNIZATION OF BUSINESS MANAGEMENT

Since the early 1970's, the FAs have been deriving more of their income from their supply, marketing and credit services, which have grown in variety and scale, than from the services which they perform for the government. In order to enable the FAs to improve their management and operate according to modern business principles, JCRR has in recent years assisted in the establishment of an efficiency-oriented FA remuneration system, conduct of management workshops for FA general managers, recruitment/training of college graduates as FA program specialists, and recruitment of FA employees through open, competitive examinations. In addition, at JCRR initiation, joint FA production-marketing systems for feeds and pesticides have been established to increase the operating efficiency.

Today, there are two FAs at the provincial/municipal level, 20 at the county/city level and 283 at the township level. Their warehouses are capable of storing, on behalf of the government, 1.1 million metric tons of rice and 650,000 metric tons of fertilizers. Their rice milling capacity amounts to some 3,800 metric tons per day. In 1976, the business volume of all FAs covering the supply of farming requisites and daily necessities and the marketing of hogs, vegetables, fruits, mushrooms, asparagus and onions, totaled about NT$6.9 billion. In 1977, the FA network hired 1,231 extension workers and spent some NT$433 million on agricultural extension, cultural and welfare activities.

農會企劃專員研究會，結業學員合影。
Participants in a training course for FA program specialists

農業推廣

在日本佔據臺灣時期，以行政手段强迫農民採用新品種及栽培新作物。光復初期，則偏重於以補助方式誘導農民改進生產，兩者對於科學知識與技能的傳播都缺乏堅實的基礎。近二十六年來，農復會倡導實施「聯合農業推廣工作」，其目的在於採取歐美各國優點，以民主教育的方法，促使農民自願接受新知識、新技術與新觀念。

在體制上，農復會認爲除必要的技術與經費協助外，絕大部份的農業推廣工作應在政府的督導下透過各級農會執行，促使農會與農民會員的關係更爲密切，而農會發展信用、供銷與農業推廣等三項業務亦可收相輔相成的效果。至於農會的信用及供銷業務部門則以其一定比例的盈餘撥充農業推廣工作的經費，亦完全符合「取之於會員，用之於會員」的原則。

根據農復會與美國米蘇里大學所作抽樣調查，發現臺灣同一村落中的農民對於各種農業知識來源的利用程度，構成了統計學上所謂「雙高峰」的分佈；富有進取心的農民充份利用農會農事指導員的服務，獲得「最具影響力」的知識，而保守的農民則再從進取的農民獲得最實用的知識。透過此一途徑，農業新知的傳播異常迅速，證明臺灣現行的農業推廣制度可行而有效。

臺灣的農業推廣工作包括農事、家政及四健會三個部門，分別以成年農民、農家主婦及十三歲至二十四歲的農村青少年爲其推廣對象。

1

1. 推廣人員示範動力噴霧機的使用。
   An extension worker demonstrating the use of a power sprayer.
2. 台東縣農業推廣人員舉行露營活動。
   Camping by extension workers of Taitung county.
3. 婦女農事研究班舉行月會。
   A monthly meeting of a farm discussion group for women.

2

Agricultural Extension

During the Japanese occupation of Taiwan, farmers were forced by administrative measures to adopt improved varieties and plant new crops. In the immediate postwar years, subsidies were a major incentive for the farmers to improve agricultural production. Neither approach, however, provided a sound footing for the dissemination of farm information and technical know-how. In the past 26 years, JCRR has promoted "cooperative agricultural extension," which emphasizes the employment of democratic and educational methods to persuade farmers to learn new knowledge, adopt new techniques and accept new ideas of their own free will.

Basically, it has been JCRR's stand that agricultural extension should be implemented through the system of farmers' associations under government supervision. This arrangement serves to join the associations and their farmer members closer together on the one hand, and to bring argicultural extension into a complementary relationship with the farm credit, supply and marketing services of the FAs, on the other. Besides, the FAs' financing of agricultural extension with part of the earnings from their economic services is in keeping with the principle that what is taken from the members should be used for the members' benefit.

A sample survey jointly conducted by JCRR and the University of Missouri found that there was a distinct bi-model distribution of the farmers involved in the use of farm information sources. Progressive farmers learned "the most influential information" from farm advisers of farmers' associations, while the conservative ones got "the most practical information" from the former. Thus, interpersonal communication within a rural community is highly conducive to the quick acquistition and dissemination of scientific farm information among farmers. The above finding also shows that the current agricultural extension system in Taiwan is desirable and efficient.

Taiwan's agricultural extension consists of three aspects: farm extension for adult farmers, home economics extension for farm women, and 4-H club extension for rural youths. Their development is described as follows:

3

農事推廣

農復會美籍農業推廣專家卜普於民國四十三年十一月抵臺，翌年三月選定臺南縣善化鎮、桃園縣桃園鎮及宜蘭縣頭城鎮試辦平地農事推廣，另在新竹縣五峰鄉試辦山地農事推廣。各地居處相鄰，興趣相近的農民在鄉鎮農事指導員協助下組成農事研究班，經常召開討論會或舉辦參觀與競賽活動，互相交換經驗與知識，並觀摩彼此的改進成果。二十三年來，平地農民所組成的農事研究班已逾六千班，遍及二七二個鄉鎮（市區），班員達十萬人，其中包括近三年組織的婦女農事研究班三百班，班員四千人。山胞農事研究班亦擴展至五十三個山地與平地鄉鎮，共有二七四班，班員五、一七九人。

五十二年至五十八年，農復會曾針對部份地區農民的需要，先後提供無息貸款及補助經費，支援省農林廳與各級農會推行水稻與雜糧共同栽培，使耕地毗連的農民得以擴大其耕作規模，經由分工合作方式，充分利用農業機械及共同採用優良品種技術等途徑，節省生產成本、提高經營收益。

五十八年至六十三年，農復會先後支援三十八個鄉鎮農會試辦農家綜合發展工作，由農會指導員協助農家根據經營紀錄，擬定改善農場經營計畫及預算，運用無息貸款與補助款調整農場業務，採行優良技術，控制生產成本，達到增加農家收益的目的。近年來並推行綜合發展示範村計畫，經選定十六個村里，鼓勵全體農家參與農場經營改進、農村社區環境改善及農村青少年輔導工作，以普遍提高農家所得與生活水準，達成農村全面發展的目的。

農場共同經營班噴藥隊，在共同經營區內實施病蟲害防治情形。
Members of the spraying team of a joint farming group at work.

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1. 各綜合發展示範村中普設水稻育苗中心。
   One of the rice nursery centers set up under the demonstration program for integrated development.

2. 崙頂綜合發展示範村。
   The Lunting Demonstration Village for Integrated Development.

FARM EXTENSION

In March 1955, under the direction of Dr. James D. Pope, JCRR extension education adviser, a pilot farm extension project was started at five lowland and two aboriginal townships. Assisted by farm extension advisers, local farmers with adjoining lands and like interests organized themselves into farm discussion groups and took part regularly in such educational activities as discussion meetings, observation tours, and contests to exchange ideas, experiences and knowledge. In the past 23 years, more than 6,000 farm discussion groups with a total membership of some 100,000 have been set up in 273 lowland townships; they include 300 groups organized by 4,000 farm women in the recent three years. During the same period, 5,179 aboriginal farmers have enrolled in 274 farm discussion groups in 53 townships.

Between 1963 and 1969, JCRR provided farmers in selected areas with interest-free loans and subsidies to engage in joint farming operations for rice and dryland crop production as promoted by the Taiwan Provincial Department of Agriculture and Forestry (PDAF) and the FAs concerned. This project was aimed at enlarging the farming scale of small farmers, thereby raising the efficiency of production. By working their lands together, and through the use of farm machines and group adoption of improved varieties and practices, the participating farmers were able to produce more and better products at lower costs.

JCRR also gave financial support for a farm and home development program carried out by 38 township FAs from 1969 through 1974. The participating farm families were assisted by extension workers to keep farm records and make plans for the improvement of their farm management and home living. Interest-free loans and subsidies were extended to them to reorganize their farm operations and adopt improved practices for achieving higher production and better farm income. In addition, JCRR has in recent years been assisting in implementing a demonstration program for integrated development at 16 selected villages, which covers farm management improvement, village environment improvement, and rural youth training. This effort is expected to further raise the living standard of farm people and bring about general rural prosperity.

家政推廣

農復會於民國四十年邀請美國家政專家雷諾慈女士來臺調查農家生活狀況。四十五年，臺灣省農會先在宜蘭市等卅一鄉鎮（市、區）試辦九項有關農家生活改善的工作。翌年一月起在家政顧問畢玲絲小姐指導下，由訪問、組織、訓練、設計教材、經費支援等方面，逐步加强家政推廣工作。

最初五年，家政推廣教育係以「食物與健康」、「家庭改善」及「簡易縫紉」等三類爲重點；近十五年來，爲因應社會環境的改變及農家新的需要，又增列「家庭害蟲防治」、「兒童保育」、「美化農家環境」及「副業技能訓練」四類。其中副業技能訓練的項目包括烹飪、電綉、車綉、食品加工、人造花及編織，有助於農家婦女在農閒期間從事副業生產，增加收益。六十六年底，臺灣地區已有二四六個鄉鎮農會辦理家政推廣工作，共組成家事改進班二、三〇二班，班員總數五七、九七七人。

爲彌補家政推廣工作的缺陷，五十七年起分期補助農林廳所屬七個區農業改良場設置家政研究室，聘請大學家政系畢業生主持，進行各種農家生活改善的實驗以爲改進家政推廣的依據。此外，民政廳、農林廳及各區農業改良場經農復會迭次建議，已將原屬臨時人員的十位家政技術人員納入正式編制，使家政推廣工作的策劃、訓練與督導等業務得以生根並加强推行。

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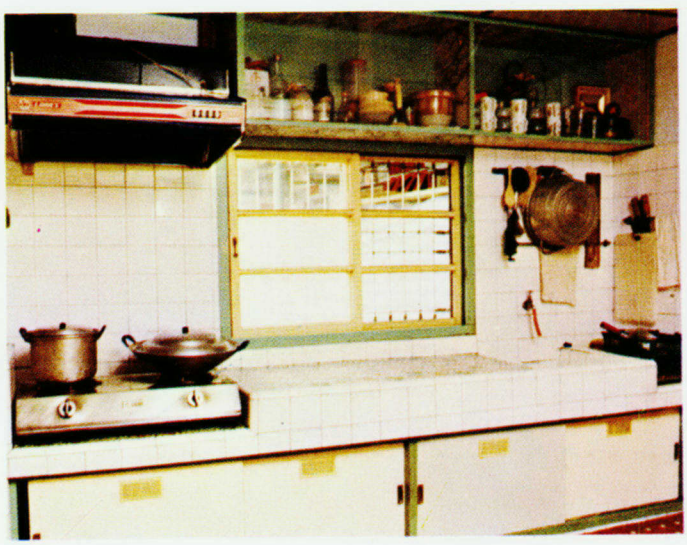

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1. 改善後的農家廚房。
   One of the thousands of improved farm kitchens.

2. 農復會顧問畢玲絲小姐視察農家廚房。
   Miss Billings inspecting the kitchen of a farmhouse.

3, 4. 家庭改善計畫實施前後的比較。
   A farmhouse before and after improvement.

HOME ECONOMICS EXTENSION

Dr. L. W. Reynolds, an American home economist, came to Taiwan in 1951 at JCRR invitation to study farm family life here. Five years later, nine pilot projects for home improvement were carried out in 31 townships by the Taiwan Provincial Farmers' Association (PFA). In early 1957, Miss Beatrice B. Billings joined JCRR as an adviser. Under her guidance, home economics extension gradually took shape and developed into one of the regular branches of agricultural extension education.

In the beginning, the home economics extension program covered only three subject-matter fields: "food for health," "home improvement," and "easy sewing." Over the years, four additional fields – "household insect control," "child care," "home environment beautification," and "sideline skills training" – have been added to meet the needs of farm families. In sideline skills training, rural women learn at the training classes conducted by FAs such skills as cooking, machine sewing, food processing, artificial-flower making, weaving and knitting, which enable them to earn extra income for their families during their spare time. At the end of 1977, there were a total of 2,302 home improvement clubs in 246 townships, with a combined membership of 57,977.

To enrich the content of home economics extension, JCRR has assisted in setting up a home economics laboratory at each district agricultural improvement station (DAIS). Staffed by college graduates in home economics, these laboratories conduct home improvement experiments, with the results to serve as a basis for strengthening the extension program. At JCRR suggestion, a total of 10 home economics specialists employed on a temporary basis by the Provincial Department of Civil Affairs (PDCA), the Provincial Department of Agriculture and Forestry (PDAF), and the DAISs have been placed on their regular payrolls so that the programming, training and supervision operations of the program will be carried on without interruption.

家政工作人員接受手工藝訓練。

A handicraft training course for home economics extension field workers.

四健會推廣

農復會故主任委員蔣夢麟博士於民國四十一年將發源於美國的四健會組織與方法引入臺灣，並於同年約聘美籍顧問白蘭德來華主持此項推廣工作。經與教育廳、農林廳及臺灣省農會會商後，選定七所農業職業學校及四個鄉鎮農會，分別試辦學校與鄉村四健會推廣工作。經過二十五年的努力，臺灣及金馬地區已有七十所中等與農業職校以及二七二個鄉鎮農會辦理四健會活動，共成立三、二三〇個四健會作業組，男女會員達五七、一二九人。

四健會的主要活動包括作業會議、會員作業、方法示範、作業經驗發表、公共服務、露營、四健會年會及國際農村青年交換訪問等，寓有運用科學方法增加農業生產、激發青年自助精神、培養未來優秀公民及農村領導人材的教育意義。

四健會在推動初期，着重於倡導會員的個人作業，藉新品種及新技術的採用，培養其對於農業生產的興趣，並爭取家長對四健會的重視與支持。民國五十四年起，農復會與有關機關選定八十五個鄉鎮農會及十個農業職校，試辦四健會員共同作業，一方面擴大作業的規模，一方面使會員有機會自行支配作業的收益。近十年來，則以舉辦技藝訓練、組織農機代耕隊與水稻病蟲害防治隊、輔導會員從事專業生產及家庭改善爲主要推行項目，對於緩和農村青少年流入都市及促進農村建設，提供了可行的途徑。

據估計，過去二十六年中曾參加四健會組織與活動的農村青少年至少達四十萬人，其中大部份於逾齡退出四健會後已成爲優秀的農民，或擔任四健會義務指導員，或爲農村中的民意代表，或爲我國農業技術援外的幹部，對於農村與國家都有貢獻。

農業傳播工作

與農業推廣關係密切的農業傳播工作，經農復會的創導與支援，亦已奠下良好的基礎。民國四十一年問世的「豐年」農業雜誌，四十四年開闢的全省農業廣播節目以及六十二年開始播映的農業電視節目，均爲農復會所提倡促成，其他如拍攝農業教育電影與幻燈片，編印農民淺說、掛圖、單張，以及巡廻車的使用等亦爲先經農復會辦理訓練與示範後，由其他農業機構擴大實施。由於以上大衆傳播媒介及視聽教材的使用，農民可從不同的來源獲得實用的農業知識，使各種農業推廣計畫產生更大的效果。

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1. 農復會故主任委員蔣夢麟博士歡迎美籍顧問白蘭德來華協助推動四健會工作。

   Dr. Chiang greeting Mr. Brundage upon the latter's arrival in Taiwan.

2. 第三屆四健會年會全體參加人員合影。
   Participants in the Third 4-H Congress.

4. 四健會會員學習編織技能。
   4-H club members learning the skill of knitting.

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3. 四健會樂隊參加慶祝活動演奏情形。
   A 4-H band giving a performance.

女性四健會會員參加採茶競賽。
4-H club members in a tea plucking contest.

四健會會員舉行鑑別競賽。
A 4-H club judging contest.

四健會會員作業經驗發表會。
Experience talk by a 4-H'er at a monthly project meeting.

4-H CLUB EXTENSION

In 1952, the late JCRR chairman Dr. Chiang Monlin introduced the American 4-H club movement into Taiwan. In the same year, Mr. A. J. Brundage was invited to serve as a JCRR adviser in charge of the extension of this movement. After consultation with PDAF, PDCA and PFA, 4-H club activities were started in seven V-Ag schools and four townships on a trial basis. Now, on Taiwan and the offshore islands of Kinmen and Matsu, there are 3,230 4-H clubs with a total membership of 57,129 boys and girls, set up by 70 secondary and V-Ag schools and 272 township FAs.

Major 4-H club activities include club meetings, home projects, method demonstrations, public talks on project achievements, community services, camping, 4-H congresses, and international farm youth exchange visits. All these are educational in nature with special emphasis on the use of scientific methods for farm production, cultivation of the spirit of self-reliance, and development of better citizenship and leadership in rural areas.

During the initial stage, the club members were encouraged to carry out their own production projects by the use of recommended varieties and practices. This helped develop their interest in farming and win the support of their parents for the movement.

Beginning in 1965, JCRR and other agencies concerned helped 85 township FAs and 10 V-Ag schools to recruit senior 4-H club members for participation in group production projects. This was designed to expand the production scale and enable the participants to dispose of, in ways of their choice, the earnings from their own projects. In the recent 10 years, 4-H educational projects have been focused on vocational training, organization and operation of mechanized custom farming teams and pest and disease control teams, specialized farming, home improvement, etc. These projects have contributed to the acceleration of rural development in general and slowed the outflow of rural youths in particular.

In the past 26 years, an estimated 400,000 rural youths have joined in 4-H club activities. An impressive proportion of the former 4-H club members have become outstanding farmers, volunteer 4-H club leaders, civic leaders, or members of Chinese agricultural technical missions serving in foreign countries.

AGRICULTURAL INFORMATION

Closely related to the cooperative extension work are agricultural information services which have become well established in Taiwan through the efforts of JCRR. The publication of the farm magazine *Harvest* in 1952, the inauguration of island-wide farm radio programs is 1955, and the inception of agricultural TV broadcasts in 1973 were all made possible by JCRR promotion and support. As a result of JCRR assistance in training and demonstration, various educational materials including agricultural films, slides, bulletins, pamphlets, posters and leaflets are now produced regularly by the agencies concerned. The extensive use of mass media and audio-visual aids has not only enabled more farmers to get practical farm information from varied sources, but also enhanced the impact of agricultural extension.

豐年社編輯部人員工作情形。
Editorial staff of the "Harvest" farm magazine.

農貸

臺灣農業的進步及農家經濟的改善有賴於農貸的密切配合支援。三十年來農復會在農貸方面所作努力，主要在透過各種先驅性計畫的推行，協助健全農貸制度，充裕農貸資金來源，改進農貸機構的貸款服務與手續，以求充分供應在期限與利率兩方面均能適合農家實際需要的農貸資金。至農復會本身的貸款，除供農、林、漁、牧生產用途外，對於水利及運銷等設施的加強與改善，亦予支援。

推行輔導農貸

在光復初期，農家主要係以集約投入家庭勞力方式經營農業，所需的少數生產資金多由私人貸放融通。但經過一段時期後，此種農業經營方式成爲農業發展的阻力，亟須設法協助農家增加資本投入，改變農業經營方式以提高生產力。農復會於民國四十四年至四十九年間先後提供貸款資金約一億元，實施若干示範及試驗性農貸計畫，採行「輔導農貸」融資方式，協助並鼓勵農業行庫及農會信用部改進貸款條件與手續，加强辦理農貸放款。

輔導農貸以「貸款與技術指導相輔相成，以求善用貸款並確保貸款的收回」爲前提，此種融資方式的推行，一方面促使農民有效的將貸款用於生產，同時也充份證明農貸不一定要有抵押才能安全收回，從而增强農貸機構對於辦理小農貸款的信心，穩固臺灣農業金融制度的基礎，減低農家對私人借貸的依賴程度。

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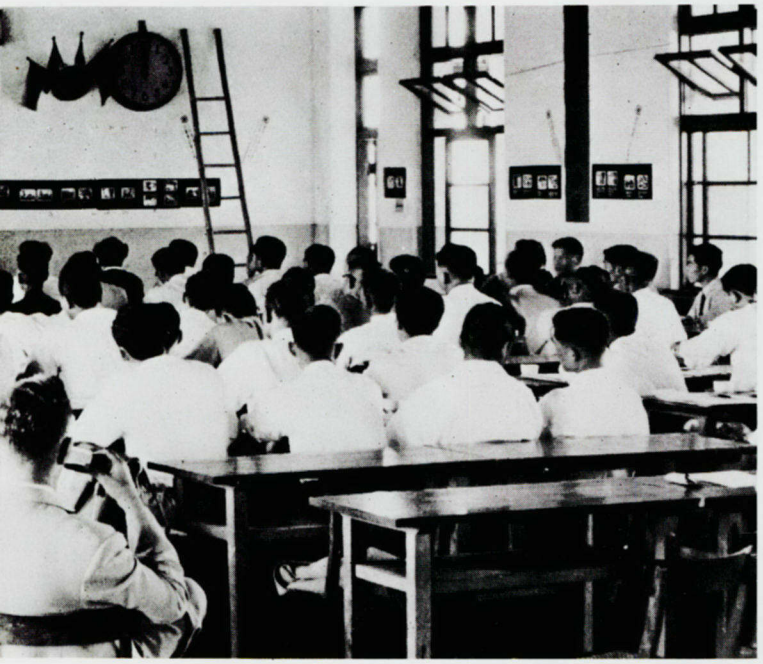
Agricultural Credit



AGRICULTURAL CREDIT

One of the key factors contributing to Taiwan's successful agricultural development has been the ample supply of credit in times of need. During the past three decades, JCRR has provided loans not only for various production purposes but also for the improvement and construction of irrigation, marketing and other facilities to help build up the island's rural infrastructure. In addition, a number of innovative and demonstrative types of projects initiated by JCRR and aimed at establishing a sound agricultural credit system have been carried out with good results. There has been a general improvement in the services of agricultural credit institutions, and more credit funds have now become available to the farmers on terms better suited to their needs.

PROMOTION OF SUPERVISED AGRICULTURAL CREDIT

In postwar years, Taiwan's agriculture was marked by heavy input of family labor. The farmers had only limited credit needs, which were provided mostly by private lenders. After a period, it became apparent that such a farming pattern would constitute a barrier to agricultural development, and that to attain a higher productivity would require more capital use on the farm.

Between 1950 and 1960, JCRR made available about NT$100 million in loan funds for carrying out a number of experimental and demonstrative supervised credit programs, with the aim of encouraging agricultural banks and famers' associations credit departments to improve their credit services.

Supervised credit emphasizes coordination between credit extension and technical assistance to ensure the efficient use of credit by the farmers on the one hand and successful collection of repayments, on the other. Its implementation has demonstrated that loans can be extended at little risk even without collaterals, and this fact has strengthened the confidence of agricultural credit institutions in serving small farmers, stabilized the foundation of the agricultural credit system, and reduced farmers' dependence on private lenders.

1. 農會信用部作業情形。
   The credit department of a township FA.
2. 民國五十一年舉行的農貸會議。左方爲農復會前委員葛威廉，右方第一人爲前農業信用組組長包以敦。
   Former JCRR Commissioner William J. Green (left) and former chief of JCRR's Agricultural Credit Division Kenneth E. Boyden (right) at the Agricultural Credit Conference of 1962.
3. 爲基層農貸人員舉辦的輔導農貸講習會。
   A credit refresher course for township FA credit men.

創辦統一農貸

臺灣的農業經營至四十年代末期及五十年代已趨向資本集約化，農家更殷切企望農貸機構的資金支援，但因多數鄉鎮農會信用部財務基礎脆弱，經營管理亦未上軌道，未能充分發揮基層農貸機構應有的功能。針對此一事實，農復會經與有關機關磋商籌劃年餘後，於五十年五月創辦一項全省性的統一農貸計畫，以期逐漸加强鄉鎮農會信用部的財務基礎，改進貸款手續，並充裕農貸資金的來源。

在統一農貸計畫項下，農復會先後提供新臺幣四億八千餘萬元無息及長期低利貸款，直接或間接支援二六五個鄉鎮農會信用部加强辦理農貸，並設置農貸輔導員實地從事指導工作；同時協助政府研訂農會信用部財務及業務管理基本措施，加强訓練基層人員。另協助於四十九年九月成立「農貸計畫委員會」，以後演變爲中央銀行農業金融策劃委員會，統籌策劃全國農貸計畫。

統一農貸計畫逐年擴大推行，目前臺灣農民多可隨時隨地申借此項貸款，放款金額累計已超過二〇〇億元，受益農民佔臺灣農戶半數以上。在統一農貸計畫下逐漸普及的「輔導農貸」融資方式亦深受國際間的重視，成爲東南亞發展中國家辦理小農貸款的範例。統一農貸開辦十七年以來，全體農會信用部存款由十億元增至三五〇億元，放款由八億元增至二一〇億元，自有資本亦增加了約二十三億元，顯示農會的財務及業務都有相當的改進，今後也將更能發揮基層農貸機構的功能。

舉辦政策性專案農貸

爲配合政府實施加速推行農業機械化方案，農復會與財政部及農業行庫共同出資於六十一年七月起開辦「加速農業機械化貸款計畫」，貸放農民購買農機所需的長期低利貸款，其中由農復會提供的資金達新臺幣五億三千萬元。截止六十六年底共計貸放二十九億餘元，推廣主要農業機械四萬七千餘台。爲因應今後全面推行農業機械化的需要，政府已決定以四十億元設置一項「農業機械化基金」，以供辦理長期低利農機貸款，預定於六十七年起至七十年間實施，農復會將每年提供貸款資金配合推行。

另爲支援政府推行加速農村建設重要措施，六十二年起開辦「加速農村建設貸款計畫」，由農復會、中央銀行、農業行庫及鄉鎮農會共同出資，以較優厚條件辦理貸款。截至六十七年度共核准一六四項細部貸款計畫，貸款金額達四十四億餘元。農復會除提供無息及低利長期貸款資金共計五億餘元外，並負責審查細部貸款計畫及輔導基層農漁會的貸款業務。

農會信用部向農民貸放統一農貸情形。
A farmer receiving a UAC loan at an FA credit department.

UNIFIED AGRICULTURAL CREDIT PROGRAM

During the late 1950's, farming in Taiwan gradually became more capital intensive. There was a general rise in farmers' credit needs, but most FA credit departments were unable to meet this increased demand owing to their weak financial structure and inefficient management. To solve this problem, JCRR initiated an island-wide Unified Agricultural Credit Program in May 1961. The program is aimed specifically at strengthening the financial position of FA credit departments and simplifying their lending procedures in the interest of borrowers.

Under the UAC program, JCRR has in the past years provided an aggregate of NT$480 million in both interest-free direct loans and low-interest indirect loans to the credit departments of FAs to fortify their lending capability. Meanwhile, JCRR has assisted the government in training township credit workers and in formulating fundamental measures for the improvement of FAs' financial and operational management. In May 1960, an Agricultural Credit Planning Board was set up, which was the predecessor of the existing Agricultural Credit Planning and Coordination Committee of the Central Bank of China.

As a result of the expansion of the program, UAC loans are now accessible to every farmer on the island. In the past, over NT$20 billion of loans in cumulative total have been extended to more than one half of Taiwan farmers. The program has won international recognition as a model credit scheme for small farmers for the developing countries in Southest Asia.

農貸人員訪問農民探詢農機貸款使用情形。
Supervision of use of a farm mechanization loan.

SPECIAL AGRICULTURAL LOAN PROGRAMS

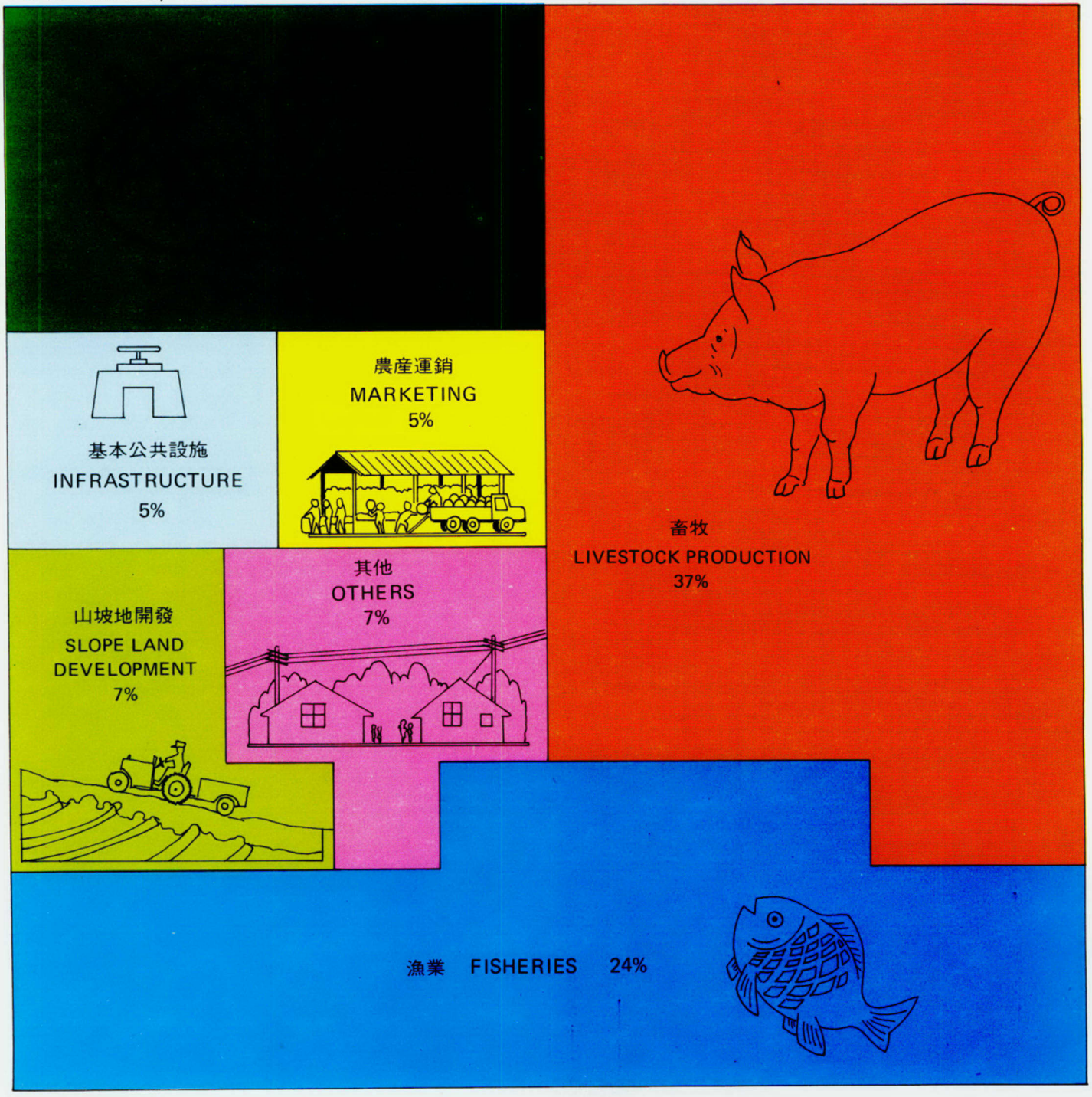
In support of the government effort for accelerating farm mechanization in Taiwan, a farm mechanization loan program was launched in July 1972 jointly by the Ministry of Finance, JCRR and three agricultural banks. To date, JCRR's contributions to the program have reached NT$530 million in cumulative total. By the end of 1977, the loans extended under the program totaled NT$2.9 million, with which the borrowers purchased 47,000 units of farm machines. To provide sufficient financing for an expanded farm mechanization program covering also fisheries, animal farming and afforestation, the government has decided to establish a special loan fund of NT$4 billion for use from 1978 to 1981. JCRR will give active support to this endeavor and make financial contributions to the fund on an annual basis.

Another loan program, which is designed to provide easy-term credit in aid of the implementation of various grant projects of the Accelerated Rural Development Program, has been in progress since 1973 with contributions from JCRR, the Central Bank of China, agricultural banks and township farmers' associations. Up to the end of June 1978, 164 loan projects involving NT$4.4 billion had been approved, for which JCRR contributed NT$500 million in both interest-free and low-interest bearing loans. JCRR has also been responsible for screening the loan projects and supervising the related credit operations of township farmers' associations and fishermen's associations.

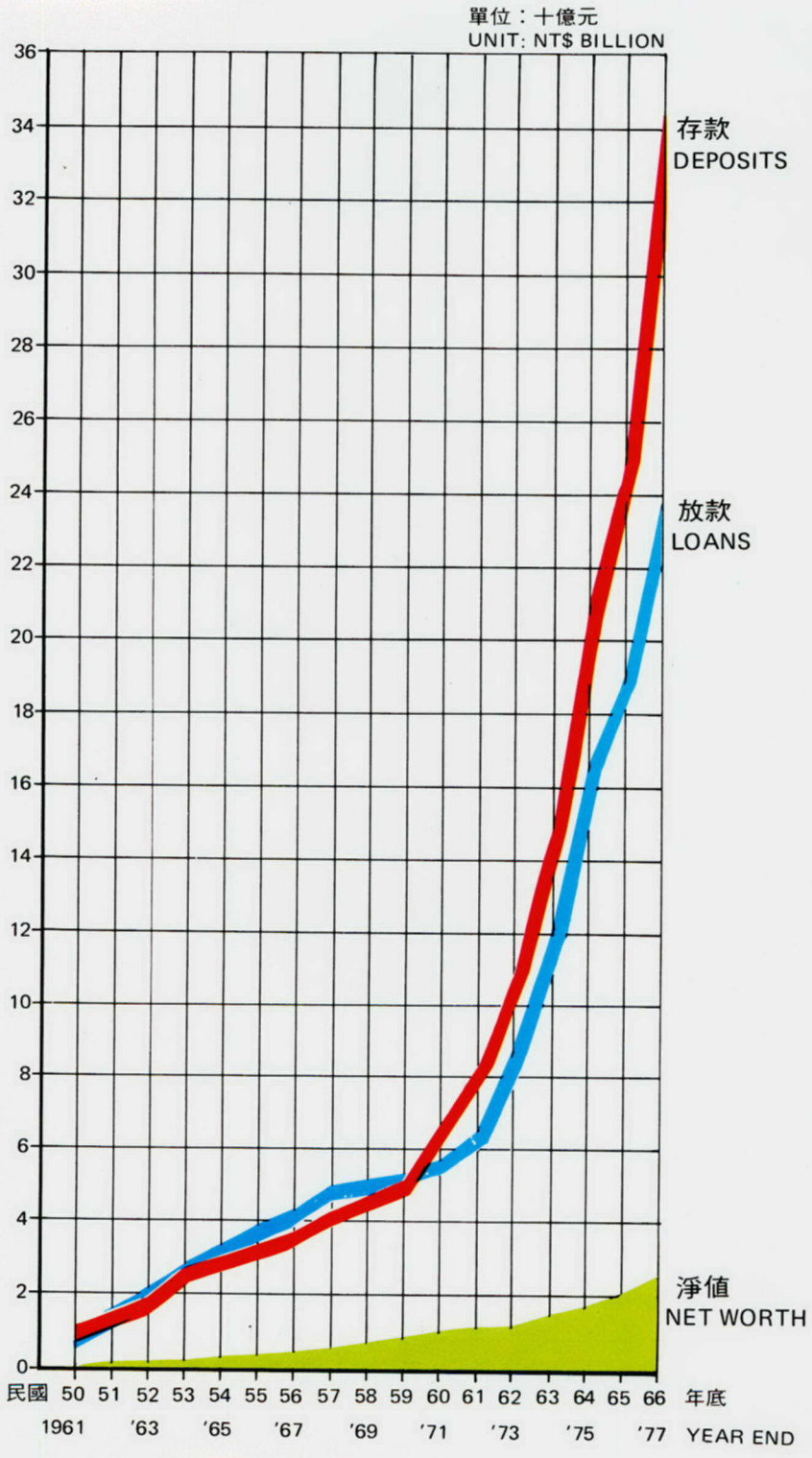
加速農村建設貸款計畫辦理情形
STATUS OF ARDP LOAN PROGRAM

（截止民國六十七年六月三十日）
AS OF JUNE 30, 1978

核准金額
LOAN APPROVALS: NT$ 4,444,778,000



歷年來農會信用部存款放款及淨值成長情形
GROWTH OF FA CREDIT OPERATIONS



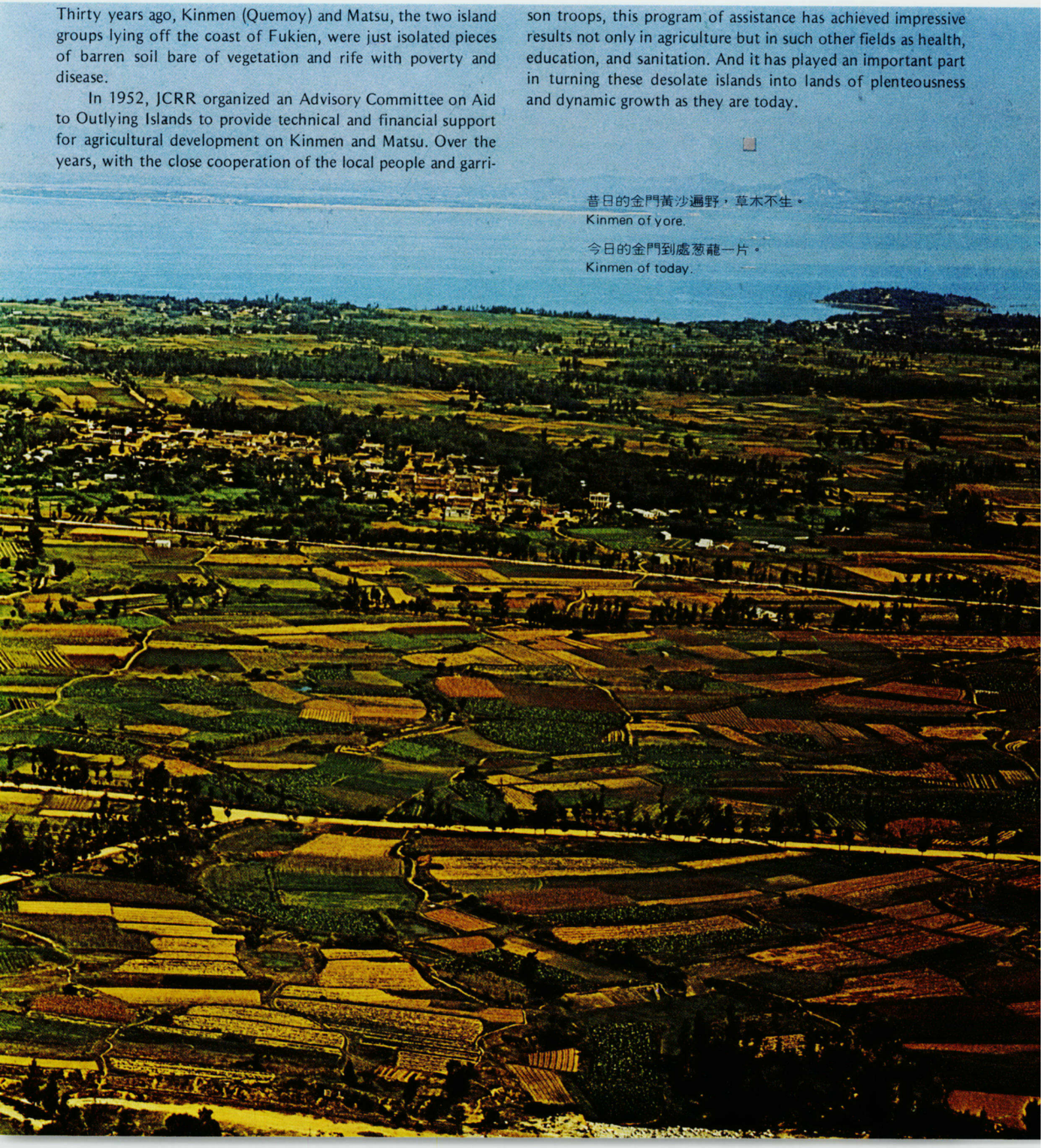
外島農業建設

民國三十八年共匪竊據大陸後，金門與馬祖成爲屏衛臺澎復興基地的前哨，戰略地位重要。當時兩島不僅地瘠人貧，而且流行疫病，時有天災。農復會爲支援金、馬的建設，於四十一年成立外島輔導小組，本「由無而有」，「由點而面」，「由舊而新」及「由劣而優」的原則，逐步推展。由於地方軍民的同心協力，所提供的援助得以發揮最大的效用。二十七年來完成的各項建設已將金門、馬祖轉變爲家給戶足、林木葱蘢、生氣蓬勃、安和樂利的社區。國人以此種成就譽爲「金馬精神」，殊非偶然。

Agricultural Development on Outlying Islands

Thirty years ago, Kinmen (Quemoy) and Matsu, the two island groups lying off the coast of Fukien, were just isolated pieces of barren soil bare of vegetation and rife with poverty and disease.

In 1952, JCRR organized an Advisory Committee on Aid to Outlying Islands to provide technical and financial support for agricultural development on Kinmen and Matsu. Over the years, with the close cooperation of the local people and garrison troops, this program of assistance has achieved impressive results not only in agriculture but in such other fields as health, education, and sanitation. And it has played an important part in turning these desolate islands into lands of plenteousness and dynamic growth as they are today.



昔日的金門黃沙遍野，草木不生。
Kinmen of yore.

今日的金門到處葱蘢一片。
Kinmen of today.

農業

金門縣農業試驗所規模與設備原極簡陋。民國四十二年起，農復會陸續補助興建房舍，增購器材，擴大編制，試驗用地至五十年時已由〇・八公頃增至八・四公頃。翌年又增設后壟試驗場，佔地二十餘公頃，足以擔負起作物、禽畜改良與造林育苗的工作。

金門的作物改良試驗，因當地水源不足，係以雜糧、蔬菜及果樹爲主。金門農試所育成的「金門五號」及由臺灣引進的「臺中三號」雜交高粱品種，極受當地農民歡迎。六十六年春作與宿根栽培的種植總面積爲一、六八八公頃，總產量達五、一二三公噸，創歷年最高紀錄。金門酒廠按每公斤食米的市價收購等量的高粱，使農民獲得優厚的利潤。金門生產高粱，平時可供釀酒，爲居民提供就業機會，戰時則可供爲食用，一舉數得。

民國四十五年以前，金門與馬祖所需蔬菜幾全賴臺灣供應。農復會首先以供應種子、肥料、農藥、農具及技術指導方式，協助國防部創設金門、馬祖軍中菜園，成效良好。繼以相同方式鼓勵農民種菜，民國六十年起，金、馬冬季蔬菜的生產除供當地需要外，尚有剩餘。

六十四年，農復會鼓勵金、馬外島農民於冬季試種馬鈴薯成功，收益且較蔬菜爲高。馬鈴薯耐儲藏，可作釀酒原料，又能兼充蔬菜及主食，今後在金、馬兩地的種植面積將逐漸增加，其他蔬菜生產過剩的問題，也將因此大爲緩和。

農復會協助在金門生產水果始於民國六十年，先設置母樹園及示範圃，邀請專家作現場技術指導，舉辦講習班，並遴選當地技術人員至臺灣接受專業訓練。六十二年起開始推廣龍眼、番石榴、橫山梨、枇杷等果樹以及西瓜、洋香瓜的種植。一年後西瓜及香瓜的產量已足敷市場需要；六十四年所產番石榴、枇杷已達四萬餘公斤，且在逐年增加中。馬祖於六十二年開始引種番石榴、葡萄、橫山梨、枇杷，兩年後番石榴開始生產。

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CROP PRODUCTION

With JCRR subsidies, the Kinmen Agricultural Experiment Station began to expand its research facilities and technical staff in 1953. By 1962, the station's experimental farm had increased from the original 0.8 ha to over 20 ha, sufficient for conducting experiments in crop, livestock and tree farming.

Owing to shortage of water sources, the station's crop improvement work is limited to dryland crops, vegetables and fruit trees. Among its accomplishments is the development of a high-yielding sorghum variety "Kinmen No. 5." This and a hybrid – "Taichung No. 3" – introduced from Taiwan are now widely cultivated. In 1977, a record 5.123 M.T. of sorghum was harvested from a planted area of 1,688 ha, which were bought up by the Kinmen Distillery at the prevailing market price of rice, to the advantage of the farmers. Sorghum is the most important crop on Kinmen, which can be used to make Kaoliang liquor and provide jobs for the people in normal times, and serve as food in wartime.

Before 1956, Kinmen and Matsu depended entirely on Taiwan for vegetable supplies. JCRR first assisted the soldiers in the two areas to grow vegetables by providing them with technical guidance, seed, fertilizers, insecticides, and simple farm tools. The same kind of help was later extended to the farmers, with equally satisfactory results. By 1971, production had become more than enough for the local needs. In 1975, success was achieved in trial planting of Irish potatoes on Kinmen and Matsu, which proved more profitable than vegetables. Because of its many uses, this crop will be extensively grown on these islands in the future.

In 1971, JCRR began to promote a fruit tree planting program on Kinmen. Mother tree farms and demonstration orchards were set up, on-the-spot technical guidance provided, training classes conducted, and local technicians sent to Taiwan for training. Starting in 1973, longan, guava, pear, and loquat seedlings were planted and watermelon and muskmelon seeds sown. One year later, enough melons were produced to meet the market demand. In 1975, the output of guavas and loquats totaled more than 40,000 kg. On Matsu, guava, grape, pear and loquat trees were planted in 1973, and the first guava harvest was made two years later.

1. 馬祖種植的番石榴樹。
   A guava plantation on Matsu.
2. 金門的主要農作物——高粱。
   Sorghum – a major farm crop on Kinmen.

林業

二十六年前的金門，童山濯濯，風沙蔽天，因氣候乾旱，造林極感困難。民國四十一年農復會空運樹苗數十萬株至金門，指導駐軍栽植，在官兵細心照料下，成活率甚高。四十五年，協助成立金門林務所，負責培育苗木，訓練育苗造林技術人才，以奠定擴大造林的基礎。六十五年，該所苗圃面積達四十公頃，每年可培育苗木三百萬株，供軍民栽種。目前全島海岸防風林、山地保留林、耕地防風林及行道樹共有七千五百萬株，蔚成一片蔥綠的海上公園。主要樹種包括木麻黃、大葉桉、樟樹、楓樹、松類及竹類。依照農復會協助金門林務所編定的「林業經營計畫」，今後金門造林工作將以推廣經濟價值較高的樹種爲原則，同時注重實施疏伐、修枝及加强對森林火災的防範。

馬祖的造林工作始於民國四十五年，在農復會經費與技術協助下，軍政當局要求每一軍民負責植樹十五株，其後各年所需苗木漸可由當地苗圃就近供應。六十六年底，馬祖各島嶼已成林的樹木約達二千萬株，以相思樹及黑松居多。

馬祖公路旁的行道樹。
A tree-lined highway on Matsu.

金門林務所苗圃。
The tree nursery of the Kinmen Forestry Station.

FORESTRY

Trees were almost non-existent on Kinmen 26 years ago, where aridity of the land and drifting sand made afforestation extremely difficult. In 1952, at the request of the military, JCRR airlifted several hundred thousand saplings to Kinmen and taught the soldiers to raise them. The survival rate was very high. Later, JCRR assisted in setting up a forestry station and training technicians in nursery management and reforestation. Since 1976, the station's nursery has been able to supply about 3 million seedlings annually for new plantings. To date, some 75 million trees have been planted; the species include casuarina, eucalyptus, camphor, liquidambar, and pine. A long-range forestry development plan for Kinmen has been formulated with JCRR assistance; it calls for planting of trees of high economic value, thinning and pruning of existing trees, and prevention of forest fires.

On Matsu, a JCRR-supported afforestation program has been in progress since 1956. Under the program, about 20 million trees, mostly acacias and black pines, have been raised to date.

漁業

對日抗戰以前，金門、馬祖漁業全盛時各有漁船千餘艘，每年漁獲量共約一萬公噸。大陸陷匪後，漁業一落千丈，漁業人口不及總人口五%。農復會自民國四十三年起逐年協助金門與馬祖振興漁業。歷年來採取的措施包括加强漁會及漁業生產合作組織，改進魚貨運銷制度，辦理漁船漁具專案貸款，補助及貸款修復與新造中、小型動力漁船，興建魚市場、冷藏庫、製冰廠、漁網寮、晒魚場、接魚站等公共設施，推薦各種改良及新式漁網具，舉辦漁撈技術講習，洽請軍方放寬漁民出海作業時間，簡化申請出海手續，獎勵指導養殖漁業等。

至六十六年，金門漁民共有二十～四十九噸級機動漁船二十六艘，二～十噸級機動舢舨一〇五艘、舢舨一二七艘、竹筏七十五艘，全年漁獲量達三、九一〇公噸。目前尚正在規劃興建漁港一處。馬祖近年不同噸級的動力漁船亦已增至一八七艘，非動力漁船共有一七九艘，年漁獲量亦達二、五〇〇公噸。

由於養殖方法的改良，金門牡蠣產量激增，紫菜養殖亦在大量推廣中。馬祖的海帶養殖已實驗成功，甚有發展潛力。目前金馬地區鮮魚供應無缺，且有剩餘可供加工，高級魚類如鰤魚、黃魚、白力魚等更暢銷臺灣市場。

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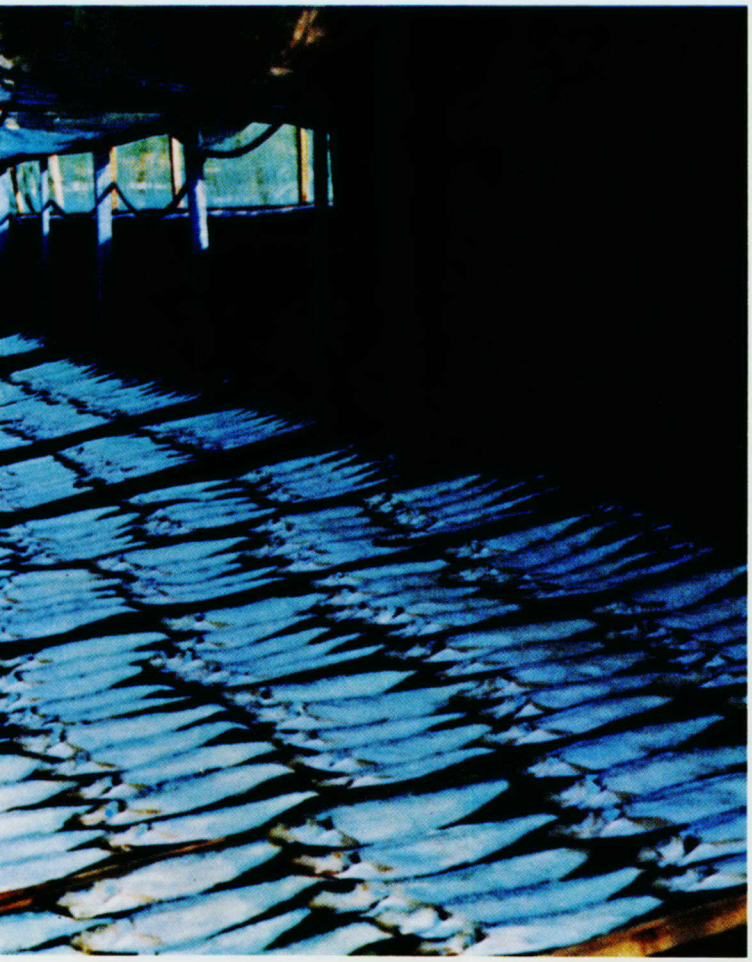
1. 農復會主任委員李崇道在馬祖參觀白力魚加工情形。
   JCRR chairman Robert C. T. Lee visiting a white herring processing plant on Matsu.
2. 金門的動力漁船。
   Powered fishing craft on Kinmen.
3. 金門水產站及養殖池。
   The Kinmen Fishery Station and its fish culture ponds.
4. 金門冷凍廠。
   The Kinmen Cold Storage Plant.



FISHERIES

Both Kinmen and Matsu had a well-established fishing industry before World War II; the combined annual catch exceeded 10,000 metric tons. After the fall of the mainland in 1949, production dropped sharply, with less than 5% of the population engaged in fishing.

JCRR began in 1954 to assist in reviving the fishing industry of Kinmen and Matsu. The measures taken in the past years include strengthening of fishermen's organizations, improvement of marketing, supply of loans and subsidies for building and repair of fishing craft and construction of such facilities as fish markets, cold storage warehouses, ice-making plants, etc. JCRR also introduced various new or improved fishing methods and gear, conducted technical training classes and promoted the development of fish culture.

At the end of 1977, there were 26 trawlers of 20-49 tons, 105 powered sampans of 2-10 tons, 127 sampans and 75 bamboo rafts on Kinmen. The catch in the year was 3,910 metric tons. In the Matsu area, the local fishing fleet now consists of 187 powered boats, including 14 trawlers of 49 tons, and 179 non-powered boats and rafts, with an annual catch of about 2,500 metric tons.

The improvement of fish culture techniques has greatly increased oyster production on Kinmen; in 1977, about 600 metric tons were supplied to Taiwan. Efforts are being made to extend the culture of porphyra on Kinmen and of kelp on Matsu.

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畜牧

國軍進駐金門、馬祖初期，當地禽畜疾病猖獗，每月須仰賴臺灣供應毛豬數百頭。民國四十二年及四十五年起，農復會分別協助在兩島全面實施畜禽防疫注射，訓練畜牧獸醫人員，引進優良種豬、種雞、種蛋，補助興建禽舍，辦理豬隻人工授精，設立飼料加工廠及家畜診療室。民國六十六年更在金門推行田間養豬農牧綜合經營，利用豬糞尿產生沼氣，作爲農家燃料，並用以改良土壤，提高作物產量。六十五年底，金門飼育肉豬三二、四三八頭，肉、蛋雞二三六、五五七隻；馬祖飼育肉豬二、三九〇頭，肉雞二五、三〇〇隻，除供應當地軍民消費外，且可以季節性剩餘運銷臺灣。

水利

金、馬外島受地形及地質限制，飲用及灌溉水源極爲缺乏。農復會於民國四十三年至五十年間補助金門農民挖鑿淺井三、八九五口，四十六年至五十一年間補助馬祖農民改善及挖掘淺井三五七口，緩和了部份飲水與蔬菜灌溉水源不足的問題。五十五年至六十年，再協助建築攔水壩，計金門一三〇座，馬祖二十座，將地面雨水引入農塘。近十四年來，先後又協助金門興建中、小型水庫十一座，總蓄水量達七五〇萬立方公尺，除增加農田灌溉面積約五百公頃外，自來水供應率亦已達八八%。馬祖地區亦經補助興建中、小型水庫廿五座，使南竿、北竿與東引的飲水供應率大幅提高。

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LIVESTOCK FARMING

Owing to rampant diseases, hog production on the outlying islands used to be so low that several hundred head had to be shipped from Taiwan monthly to meet the local demand. JCRR started to support the livestock programs of Kinmen and Matsu in 1953 and 1956, respectively. The activities carried out in the past years included control of infectious diseases, training of veterinarians, introduction of superior hog and poultry breeds, construction of hog pens and chicken houses, extension of artificial insemination for hogs, and establishment of feed mixing plants and veterinary clinics. In 1977, an integrated livestock-crop farming project was launched on Kinmen to promote the use of hog manure for improvement of soil fertility and for producing mathane gas as fuel. Both areas have now attained self-sufficiency in hogs, chickens and eggs; there are even seasonal surpluses which are sold to Taiwan.

WATER SUPPLY

There are few water resources on Kinmen and Matsu that may be developed for drinking and irrigation purposes. During 1954–1962, JCRR helped drill a total of 4,252 shallow wells in the two areas in an effort to ease their water shortage problem. From 1966 to 1971, JCRR again provided funds for the construction of 130 diversion dams on Kinmen and 20 on Matsu to collect rainfall for storage in ponds. In the last 14 years, with JCRR support, 11 small and medium-sized reservoirs with a total storage capacity of 7.5 million cubic meters have been built on Kinmen. As a result, an additional 500 ha of lands have been brought under irrigation, and tap water has become available to 88% of the local population. Meanwhile, with the construction of 25 reservoirs in the Matsu area, the water supply situation on Nankan, Peikan and Tungyin islets has improved considerably.

1. 金門飼養的肉牛。
   Beef cattle raising on Kinmen.

2. 農復會故秘書長金陽鎬(右)及前秘書沈國謹(中)視察馬祖水利建設。
   The late JCRR Secretary-General Y. K. King inspecting an irrigation project on Matsu in the company of K. C. Shen, a former Sr. Administrative Assistant in charge of JCRR's outlying island program.

3. 兼供灌溉及飲用水的太湖水庫。
   The Taihu Reservoir on Kinmen, which supplies water for irrigation and drinking purposes.

衛生

農復會應國防部的要求，曾於民國四十一年及四十四年提供疫苗及醫療人員，分別在金馬地區展開撲滅鼠疫工作。其後協助設立衛生院及衛生所，充實病房與醫療設備，增加藥物供應，舉辦醫護人員訓練，每年並支援軍民全面預防注射工作。近數年協助整建各村里排水溝，設置垃圾桶，興建公廁，遷建猪舍及推行家戶衛生改善。二十餘年來，金馬地區各種傳染病已近絕跡。

金馬地區民衆「多子多孫」的觀念，過去甚爲濃厚。農復會於民國五十四年協助訓練醫師、護產士及女性訪問員，展開家庭計畫宣傳及勸導安裝「樂普」工作，成果良好。金門的粗出生率已由五十五年的千分之四・五降爲六十五年的千分之二・三九。馬祖的粗出生率則四十九年的千分之三・五降至六十五年的千分之二・七。

農會

金門縣農會及五個鄉鎮農會係於民國四十二年成立，農復會補助興建辦公房舍及倉庫，辦理信用、供銷、農業推廣與家畜保險等業務。民國六十年，鄉鎮農會併入縣農會，成爲金門縣農會辦事處，創我國農會合併的先例。目前金門縣農會信用部存款總額已超過新臺幣一億二千萬元，較合併前增加十倍以上，每年皆有盈餘。馬祖的連江縣農會係在農復會協助下於民國四十六年成立，由於各離島面積有限，農會的經濟業務僅以供應農民種子、農藥、肥料、農具爲主。

金門與馬祖自設立農會以來，農業推廣工來進展順均著，各村里均設有農事研究班、四健會作業組及家事改進班，使成年農民、農村青少年與農家婦女都有機會吸收新知識，學習新技術，培養新觀念。

教育

民國四十九年，金門中學增設高職部，由農復會提供活動教室、活動宿舍、課桌座椅及圖書儀器等設備。翌年並補助高職部畢業生四名前來臺灣學習製作竹、木、籐器工藝。六十三年，協助金門中學高職部推行農業建教合作，每年在農閒期間舉辦農漁技藝訓練班，遴選實際從事農場或漁撈工作的青年，施以一至三個月的專業訓練。四年來共舉辦包括十二種項目二十七個班次的技藝訓練，受訓總人數達九九〇人。五十一年，協助馬祖中學充實教學設備，在南竿與東引新建二層教室各一棟，爲馬祖地區最新型教室。翌年再增建課室十三間，使馬祖中學規模更爲完備。

地政

金門、馬祖地區原無地籍資料，居民時因地權所屬發生糾紛。民國四十二至四十五年間，農復會協助金門辦理地籍測量總登記與總歸戶，發出所有權狀九〇、〇八三張；並在原有地主出租的三三七公頃耕地中征購一二七・二〇公頃，轉售佃農九五三戶；四十六年放領公地六一〇・八〇公頃，受惠農戶達四、四一五戶。六十三年，再應馬祖戰地政委會之請，補助經費，並代向臺灣省與臺北市地政機關及國防部兵工署等單位借調技術人員，在極端困難的情況下，於六十六年完成馬祖地籍測量工作，共登錄土地七、二四〇筆，總面積達一、五七〇公頃，核發土地所有權狀五八八張，今後可按其宜農、宜林性質，施以合理的規劃利用。

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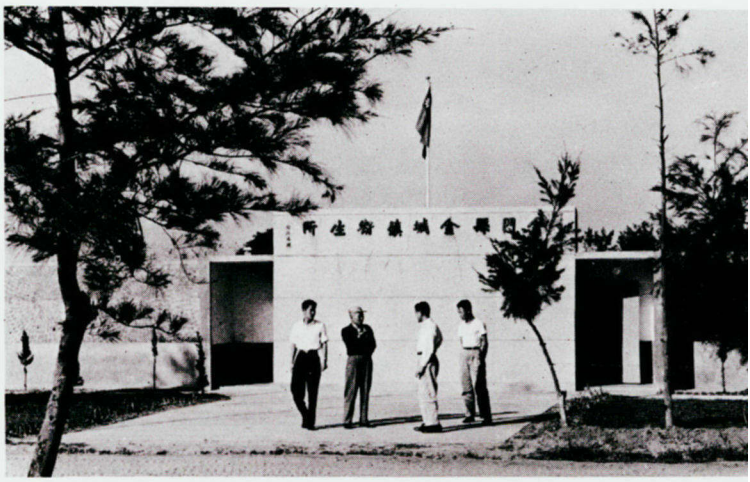

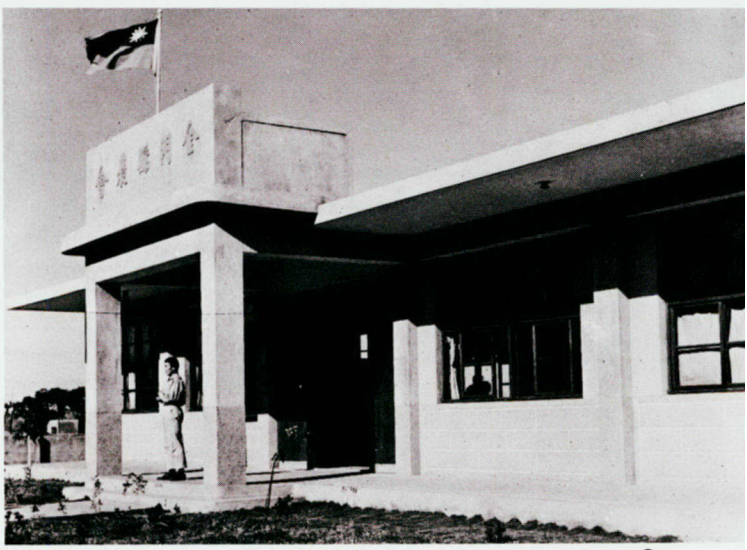

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RURAL HEALTH

At the request of the Ministry of National Defence, JCRR provided vaccine and medical personnel for the control of the bubonic plague on Kinmen and Matsu in 1952 and 1955, respectively. Afterwards, JCRR assisted these areas in establishing health centers and health stations, improving health care facilities, training nurses and midwives, and conducting vaccinations against infectious diseases. In recent years, JCRR has concentrated its efforts on environmental and home sanitation improvement.

A family planning program for the outlying islands was started in 1965. Mainly as a result of the promotion of the use of the I.U. loop, the crude birth rate on Kinmen dropped from 4.5 per thousand in 1966 to 2.39 per thousand in 1976, and that on Matsu from 3.50 per thousand in 1960 to 2.70 per thousand in 1976.

FARMERS' ASSOCIATIONS

Five township farmers' associations and one county farmers' association were established on Kinmen in 1953, which, with JCRR assistance, constructed office buildings and warehouses and began performing credit, extension, supply, marketing and livestock insurance services for the local farmers. In 1971, the five township FAs were merged into the county FA and became its branches. This amalgamation has resulted in improved operations of the Kinmen county FA as evidenced by increases in its annual earnings and in members' deposits which presently total over NT$120 million, 10 times the amount before. The Lienkiang County Farmers' Association on Matsu was established with JCRR assistance in 1957. Its economic activities are now limited to the supply of crop seeds, pesticides, chemical fertilizers and farm tools.

With the establishment of farmers' associations on these islands, agricultural extension has made remarkable progress. Every village has its own farm discussion groups, 4-H clubs and home improvement clubs, which provide opportunities for farm people to learn new technical know-how.

EDUCATION

In 1960, a vocational department was set up at the Kinmen Senior Middle School; JCRR helped by donating several quonset huts to serve as classrooms and dormitories in addition to desks, chairs, and teaching aids. The following year, under a handicraft training project initiated with JCRR support, four graduates of the school were sent to Taiwan for training in the making of bamboo, wood and rattan articles. Since 1974, JCRR has assisted the school in carrying out various training programs for youths engaged in farming and fishing. In four years, 27 training classes dealing with 12 different subjects have been conducted for a total of 990 rural youths.

The teaching facilities of the Matsu Senior Middle School were also improved with the addition of two two-story classroom buildings in 1962 and 13 classrooms in 1963, all built with JCRR subsidies.

LAND ADMINISTRATION

Kinmen and Matsu formerly had no cadastral records. In 1953-1956, JCRR assisted the local authorities on Kinmen in undertaking a cadastral survey, a general land registration and a general landownership classification, after which 90,083 land deeds were issued to individual landowners and 127.2 ha of tenanted lands compulsorily purchased from landlords were sold to 953 tenants. In 1957, under a project for the sale of public lands, 610.8 hectares were sold to 4,415 farm families.

The same kind of work was started on Matsu in 1974 and completed in 1977, with 7,240 lots of land totaling 1,570 ha registered and 588 deeds issued. This will make for the proper use of various categories of lands in the area according to their land-use capabilities.

3

1. 金門縣金城鎮衛生所。
   The Chincheng Health Station on Kinmen.
2. 金門縣農會。
   The Kinmen County Farmers' Association.
3. 馬祖中學校舍。
   A building of the Matsu Senior Middle School.

國際技術合作

技術改進在農村建設與農業發展過程中是一項不可或缺的工作。爲謀求農業技術的改進，農復會除協助各農業試驗研究機構加强工作外，並與政府密切配合，推動與各友邦在農業方面的技術合作，以期促進技術交流，增進國際友誼。

農復會本身卽爲中美兩國農業技術合作的一個最佳例證。三十年來，先後在農復會服務的中美專家多達五百餘人，他們經常與其本國及國際農業研究或學術機構保持密切連繫，加强了推展國際技術合作的基礎。因此，中美兩國政府在民國五十四年爲設置「中美經濟社會發展基金」所簽署的換文附錄中，特別闡明農復會應積極參與我國農業接受外援及提供技術援外有關的活動。

農復會倡辦的國際技術合作工作，包括下列七項：㈠選派農業技術人員及農民出國深造或受訓，迄六十七年六月底爲止，共達一、三四一人；㈡訓練友邦農業技術人員，計六、一六二人；㈢爲訪華外賓舉行簡報及安排參觀農建設施，迄六十七年六月底爲止，接待來自一二五個國家及地區的外賓達一七、四六〇人；㈣支援我國派駐外國的農業技術團隊；㈤邀請外籍專家來華服務，合計二二六人；㈥協助政府與友邦或國際機構合作在我國創設農業研究（或訓練）機構，如亞洲蔬菜研究發展中心、土地改革訓練所、養豬科學研究所、亞洲農業技術服務中心、臺灣植物保護中心等；㈦經常與外國機構交換刊物及專題研究報告，並派員出國參加農業技術性研討會議。

1. 泰國國王蒲美蓬在陳故副總統陪同下參觀我國土地改革成果展覽。

   His Majesty King Bhumipol Adulyadej of Thailand, accompanied by the late Vice President Chen Cheng, visiting a land reform exhibit in Taipei.

2. 美國大通銀行董事長大維洛克菲勒(左)一行由農復會主任委員李崇道陪同訪問台北近郊農家。

   David Rockefeller (left), board chairman of Chase Manhattan Bank, visiting a rural village near Taipei in the company of JCRR chairman Robert C. T. Lee.

1

International Technical Cooperation

Technical advancement is an essential element of agricultural development. JCRR has not only assisted in broadening and strengthening the technical base of agricultural production in Taiwan, but also taken an active part in the government effort for promoting agricultural technical cooperation with other countries to help them improve their agriculture.

JCRR itself is a fine example of technical cooperation between the Republic of China and the United States. More than 500 Chinese and American specialists have served in JCRR in the past 30 years. They have kept close and frequent contacts with home and international agricultural research and academic organizations, and this has enabled JCRR to contribute effectively to international technical cooperation.

JCRR's activities in this field include:

1. Dispatch of selected Chinese agricultural technicians and farmers to foreign countries for advanced studies or practical training. The cumulative total of trainees reached 1,341 as of June 30, 1978.

2. Training in Taiwan of foreign agricultural technicians, totaling 6,162.

3. Conduct of briefings and field trips for foreign visitors who came to observe Taiwan's agricultural development programs. Over 17,000 visitors from 125 countries were thus taken care of by JCRR.

4. Technical support to Chinese agricultural technical missions in foreign countries.

5. Invitation of foreign consultants for short-term service in Taiwan, totaling 226 persons: 112 from the United States, 79 from Japan and 35 from other countries.

6. Assistance in the establishment of international co-operative agricultural research/training institutions in the Republic of China.

7. Exchange of technical reports with foreign organizations, and participation in international agricultural seminars and conferences.

2

選派農技人員及農民出國深造或受訓

自民國四十年至六十七年六月底止，農復會選派出國深造的農業技術人員及農民共達一、三四一人，其中有八八三人係在農復會「技術協助訓練計畫」項下派往美國或日本研習，歷年來學成返國後擔任政府重要職務者包括徐慶鐘、高玉樹、謝國城、楊家麟、李連春、楊基銓、張訓舜等數十人；另有四五八人係由「中日技術合作計畫」、「中德技術合作計畫」、「農復會與日本國際工業精神文化促進會合作計畫」及農復會專案或國際機構提供訓練計畫選派出國接受訓練。

農復會的「技術協助訓練計畫」，原爲專業實務研習性質，期間以一年爲限。後因需要高級農業技術人員加强研究工作，以期獲得技術上的突破，五十五年起增辦攻讀學位的項目；至目前爲止，經選派出國攻讀碩士學位的有五〇人，博士學位的有二〇人。

在專案訓練計畫中，規模最大的一項爲六十二年與臺灣省農林廳及臺灣省農會合作選送酪農五十七名分別至美國及紐西蘭接受專業訓練，該批酪農回國後除若干原有自營牧場者外，均貸款協助建立示範酪農村。自四十六年起，並推動我國分別與美國、菲律賓、大韓民國、日本、越南及泰國合作辦理「農村青年交換訪問計畫」。歷年來，在該計畫項下共選派優秀農村青年一四二人出國訪問。

訓練友邦農技人員

在農復會協助安排下來華接受訓練的友邦農技人員共達六、一六二人，其中有半數以上（三、七四六人）爲東南亞國家自民國四十四年起在美援「第三國訓練計畫」項下派來的受訓人員，訓練項目包括土地改革、農民組織、複作制度、水利、養殖漁業、家庭計畫、農業推廣等；一、一一七人係由各國派來土地改革訓練所受訓；一、一六〇人係我國政府專案訓練計畫項下的學員；八二人係由「聯合國發展方案」資助來華學習；餘五十七人則係由美國洛基菲勒基金會、西德基金會、亞洲基金會、國際稻米研究所等國際機構資助來華接受訓練。

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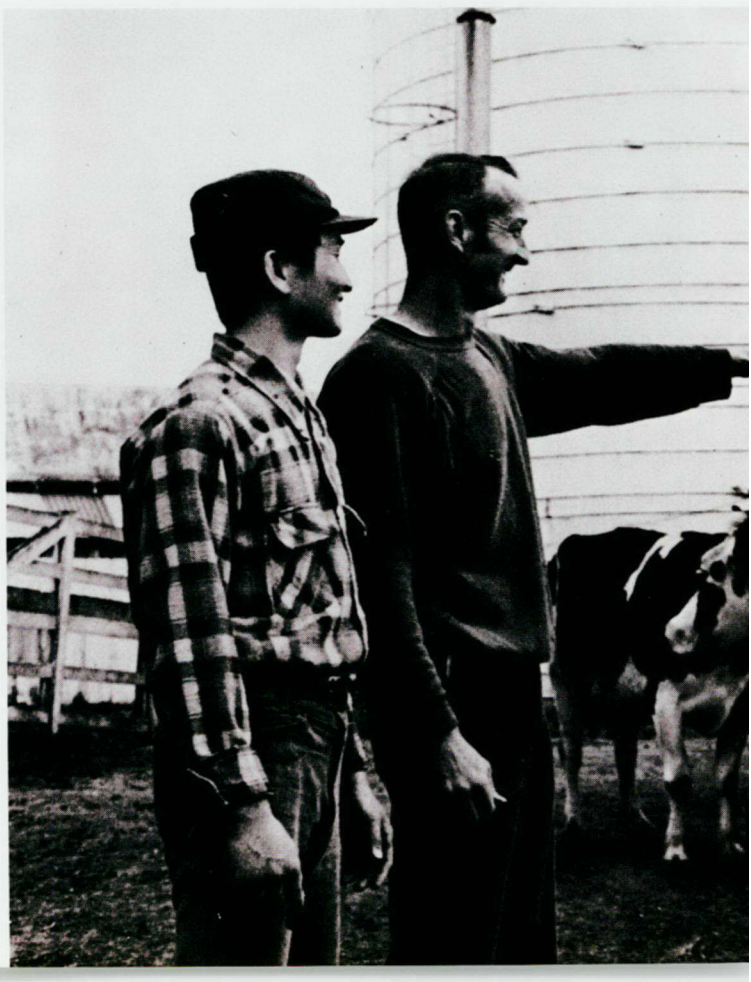


1. 在美國接受專業訓練的酪農。
2. Dairy farmers receiving specialized training in the U.S.
3. 非洲國家農技人員在我國學習水稻栽培。
   Agricultural technicians from African countries studying rice culture in Taiwan.

TRAINING IN FOREIGN COUNTRIES OF CHINESE AGRICULTURAL TECHNICIANS AND FARMERS

Of the 1,341 persons sent abroad by JCRR since 1951, 883 studied in the United States or Japan under the JCRR Technical Assistance Training Program; and 458 were trained under the Sino-Japanese Technical Cooperation Program, the JCRR/OISCA Cooperation Program, the Sino-German Technical Cooperation Program, and special training projects supported by JCRR or international agencies.

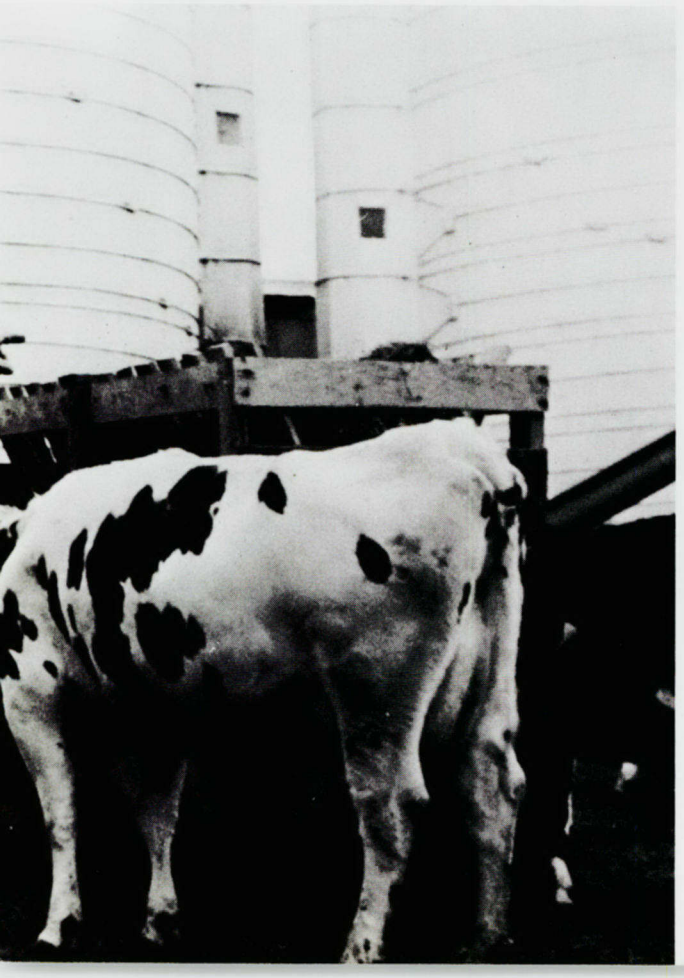
The JCRR Technical Assistance Training Program was originally designed to provide non-degree practical training to participants for periods of not more than a year. Since 1966, 70 participants have been programmed or granted time extensions for academic studies leading to a master's degree, or a doctorate, so as to meet the country's need for more high-caliber technicians.

Among the special overseas training projects of JCRR was one under which 32 dairy farmers were sent to the U. S. and 25 to New Zealand in 1973 for specialized training in dairy farming. Upon their return, they were helped with JCRR loans to establish demonstration dairy farms.

Since 1957, under the JCRR-supported farm youth exchange programs between the Republic of China and Japan, Korea, the Philippines, Thailand, Vietnam, and the U. S., a total of 142 farm youths from Taiwan have visited these countries to gain new knowledge and experience.

TRAINING OF FOREIGN AGRICULTURAL TECHNICIANS

The majority (3,746) of the 6,162 foreign agricultural technicians who received training in Taiwan through JCRR arrangements came from Southeast Asian countries and were participants in the Third Country Training Program sponsored by the U. S. Agency for International Development. The main subjects of training for them were land reform, farmers' organization, agricultural extension, multiple-cropping, irrigation, family planning and fish culture. Of the rest, 1,117 participated in the training sessions conducted by the Land Reform Training Institute; 1,160 in the training programs sponsored by the Chinese government with JCRR technical assistance; and 139 in the training projects sponsored by such international agencies as the United Nations Development Program, the Rockefeller Foundation, the German Foundation, the Asia Foundation and the International Rice Research Institute.



3

技術支助我國駐外農技團

民國四十八年，農復會率先組派農業技術團至琉球及越南共和國服務，展開我國的農業技術援外工作，後因各友邦要求與我國進行農業合作者日增，政府先後成立「中非技術合作委員會」及「海外技術合作委員會」，負責組派農技團協助友邦發展農業。農復會爲該兩委員會成員之一，經常在技術方面提供必要的支援，諸如調派技術人員前往友邦實地勘查，提供可行性建議或合作草案，遴薦農技團人員及派員視察各農技團的工作等。先後接受我國農技援助的國家累計有四十五國，遍及非洲、中南美洲、東南亞及中東地區。農復會專家調派至農技團服務者計二十七人，其中三人並曾分別擔任駐越南、印尼及沙烏地阿拉伯農技團團長。

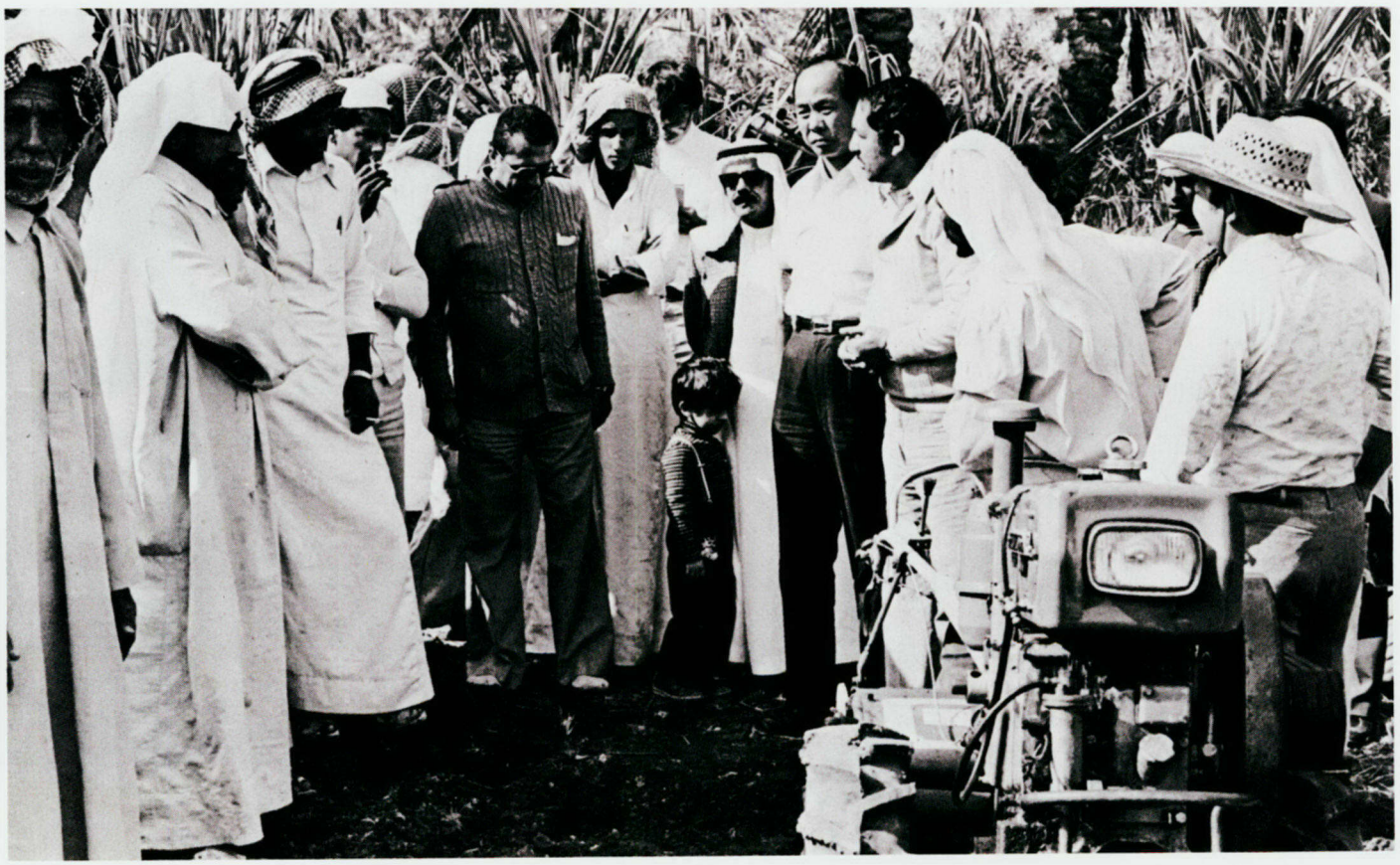
我國駐越南農技團係由農復會於四十八年十二月與越南農業部直接簽約組派，經費由美國開發總署駐越南分署提供，六十一年起改由我國政府負擔。該團工作範圍逐年擴大，至民國五十六年度已廣及作物及畜牧生產、養殖漁業、農民組織、水利發展、農村建設等方面，團員包括專家八〇人及農建隊隊員六二人。因工作表現優異，一再續約達十五年半之久，民國六十四年四月越南淪陷前撤退返國。

1. 我國駐沙烏地阿拉伯農技團團長林世同(中)向沙國農業官員及農民說明台灣製耕耘機的性能。

   Lin Shih-tung, chief of the Chinese Agricultural Technical Mission to the Kingdom of Saudi Arabia, explaining the workings of a Taiwan-made power tiller to a group of Saudi agricultural officials and farmers.

2. 東爪哇省長視察我駐印尼農技團協助建立的花生示範田。
   The Governor of East Java (center) visiting a peanut demonstration farm established with the assistance of the Chinese Agricultural Technical Mission to Indonesia.

1



TECHNICAL SUPPORT TO CHINESE AGRICULTURAL MISSIONS IN FOREIGN COUNTRIES

The Republic of China's agricultural technical cooperation program began in 1959 with the dispatch by JCRR of two groups of specialists to work, respectively, in the Ryukyus and Vietnam. Subsequently, to meet the increasing requests from foreign countries for the services of Chinese agricultural technicians, a "Sino-African Technical Cooperation Committee" and a "Committee of International Technical Cooperation" were created by the Government. As a member of both these committees, JCRR renders assistance in (1) conduct of preliminary surveys of agricultural conditions in countries desiring agricultural technical cooperation with the Republic of China, (2) preparation of detailed plans of cooperation, (3) training and/or recruitment of technicians for foreign assignments, and (4) inspection and evaluation of the work of the Chinese agricultural missions stationed abroad. So far missions have been sent to 45 countries in Africa, Central and South Americas, Southeast Asia, and the Middle East. Twenty-seven specialists on loan from JCRR have served with these missions, including three who were appointed as leaders of the missions to Vietnam, Indonesia, and Saudi Arabia, respectively.

JCRR alone was responsibile for the organization and operation of the Chinese Agricultural Technical Mission to Vietnam (CATM/VN), which served in that country for over 15 years from December 1959 through April 1975. Between 1959 and 1971 the CATM/VN operated with funds provided by the Saigon Mission of the U. S. Agency for International Development under a contract signed between JCRR and the Vietnamese Ministry of Agriculture. Beginning in January 1972, financing came from the Chinese government which entrusted JCRR to continue to supervise the mission's operations. At the request of the Vietnamese government, the staff size of the CATM/VN was once expanded to 142 men for carrying out its wide-ranging program of assistance, which covered crop and livestock production, farmers organization, fish culture, irrigation, and rural development.

2

協助政府與友邦或國際機構在我國創設農業研究(或訓練)機構

亞洲蔬菜研究發展中心

鑒於亞洲地區若干國家的人民仍面臨糧食不足及營養不良的威脅，農復會於民國五十二年開始與美國國際開發總署及亞洲各國商洽，籌設一個國際性機構，從事蔬菜的改良工作，藉以補充此一地區人民的膳食營養。經過八年餘的磋商與研究，六十年五月廿二日，中、美、日、韓、菲、泰、越等七國及亞洲開發銀行的代表在臺北簽署一項正式協議備忘錄，決定在臺南縣善化鎮成立「亞洲蔬菜研究發展中心」，這是在我國境內所設立的第一個國際性農業試驗研究機構。

亞蔬中心最高決策單位爲理事會，由各會員國代表及國際知名專家組成。首任理事主席爲農復會前主任委員及我國代表沈宗瀚博士。沈氏於六十六底退休，我國代表馬保之博士膺選繼任。中心業務由主任綜理，現任主任爲美籍穆馬博士。

亞蔬中心除致力於研究改良蔬菜品種及栽培方法外，並協助訓練專業技術人員以增進各國的蔬菜生產，有效改善當地人民的營養。目前該中心全力進行大豆、綠豆、番茄、結球白菜、甘藷及馬鈴薯等六種主要蔬菜的研究改良工作。

在大豆方面已完成具有豐產、抗病及日照鈍感等特性品種的雜交，獲得一、七〇二個組合，其中二十個組合第七代的產量，每公頃超過三公噸，較目前各國平均產量一至二公噸爲高。

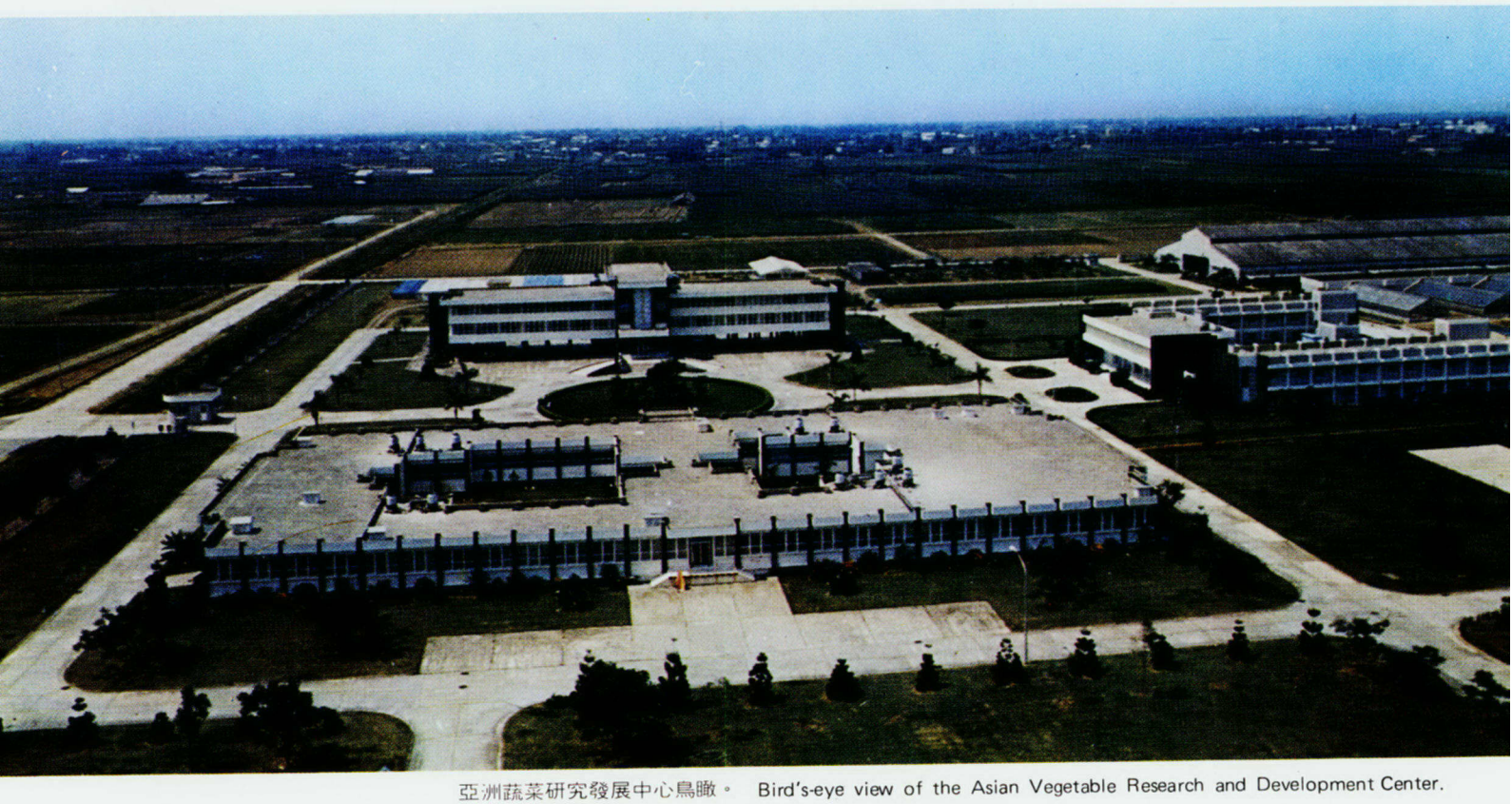
綠豆的雜交組合亦達二、四〇〇個，其中一個品系已確定爲極穩定的早熟種，平均每公頃產量達一・八公噸，較目前各國平均產量〇・六至一公噸增加甚多。

番茄品種雜交後獲得七個耐熱兼抗青枯病的品系，在馬來西亞試行栽培，每公頃產量達二十五公噸，現已由馬國農林當局展開推廣。

結球白菜品種雜交後獲得三二九個組合，平均單株重達九一〇公克，成熟期爲五十天，增加了夏季生產耐熱性結球白菜的可能性。

甘藷新品系三五～二早熟而富營養，蛋白質含量達三～七%，胡蘿蔔素含量每百公克四至十毫克，每公頃可生產約二十公噸，生長期一百天至一百二十天。

馬鈴薯新品種中，有二個品系在菲律賓的高溫低地栽培，每公頃土地可在八十三天內生產薯塊二十公噸。



亞洲蔬菜研究發展中心鳥瞰。 Bird's-eye view of the Asian Vegetable Research and Development Center.

ASSISTANCE IN THE ESTABLISHMENT OF INTERNATIONAL COOPERATIVE AGRICULTURAL RESEARCH/TRAINING INSTITUTIONS IN THE REPUBLIC OF CHINA

Asian Vegetable Research and Development Center

With a view to helping resolve the food shortage and malnutrition problems which beset many Asian peoples, JCRR in collaboration with USAID started in 1963 to enlist the support of other Asian countries for setting up a regional research organization to improve the production and quality of vegetables. After eight years' negotiations, delegates from Japan, the Republic of Korea, the Philippines, Thailand, the United States, the Republic of Vietnam, the Asian Development Bank and the Republic of China finally met in Taipei on May 22, 1971 to sign a memorandum of understanding which provided for the establishment in Shanhua, Taiwan, of an "Asian Vegetable Research and Development Center," the first international agricultural research institution ever set up in this country. The center was officially dedicated on October 17, 1973.

The Board of Directors of AVRDC, composed of representatives from member countries and renowned scientists, had as its first chairman Dr. T. H. Shen, a former JCRR chairman. Upon his retirement in December 1977, Dr. Shen was succeeded by Dr. Paul C. Ma. A director is responsible for the operation of the center; the incumbent is Dr. James C. Moomaw of the U. S.

The center has been concentrating its research efforts on six selected vegetable and legume crops: tomato, Chinese cabbage, white potato, sweet potato, mungbean and soybean.

In research on soybeans, 1,702 crosses have been made over the years to combine such excellent qualities as high yield, insensitivity to photoperiod and disease resistance. Among these crosses, 20 F_7 breeding lines yield more than 3 tons per ha, compared with the current world average of 1-2 tons per ha.

Among the 2,400 mungbean crosses made by AVRDC, a new line has been identified as a very stable early-maturing cultivar. It gives a yield of 1.8 tons per ha, much higher than the current average of 0.6-1.0 ton per ha in the world.

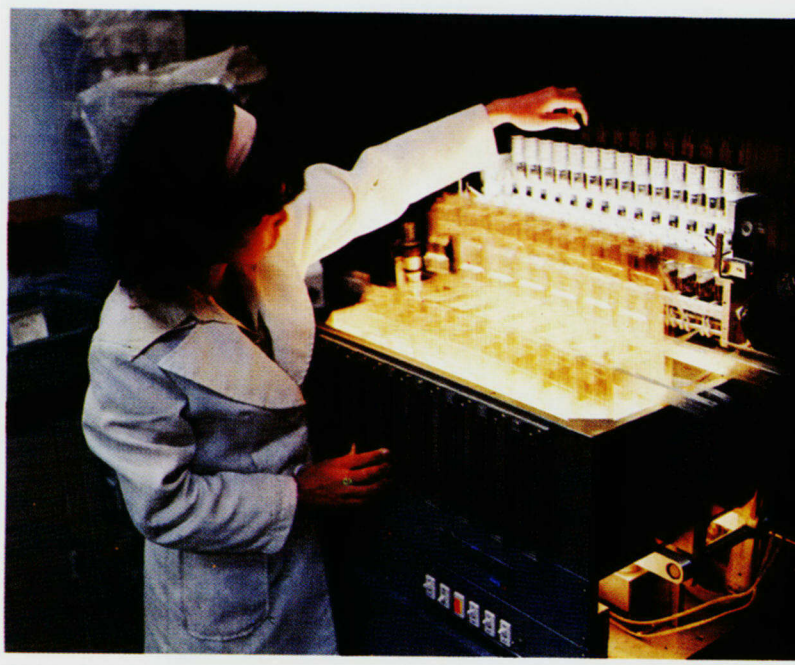
In tomato research, AVRDC specialists have developed seven heat tolerant and bacterial wilt resistant new lines. Trial plantings in Malaysia produced as much as 25 tons per ha. Malaysian agriculture authorities have started an extension program to grow the AVRDC new lines.

The center has so far turned out a total of 329 crosses in Chinese cabbage research, which on the average weigh 910 g per head and mature in 50 days. The outstanding performance of these lines increases the possibility of growing heat tolerant Chinese cabbages in summer months.

Among the new lines of sweet potato developed, the breeding line 35-2 possesses such desirable qualities as early maturity, a protein content as high as 3-7%, and a carotine level of 4-10 mg per 100 g of flesh. It has a yield of 20 tons per ha and a growth period of 100-120 days.

Two white potato cultivars originating from the center were trial planted in tropical lowland in the Philippines. They were harvested in 83 days with a yield of 20 tons per ha.

An international training program was started in 1974. By the end of 1977, a total of 106 people including graduate students and professionals in agriculture from 10 countries had been trained in vegetable research techniques at AVRDC.



亞洲蔬菜研究發展中心研究人員在實驗室工作情形。
Laboratory work at AVRDC.

土地改革訓練所

我國土地改革的成功經驗，深受國際重視。美國林肯地政學會特於民國五十六年十二月與我國國際經濟合作發展委員會及農復會合作在臺北召開「土地改革研討會」，各國經濟學家及地政專家四十餘人參加。與會人士不僅對我國土地改革的成果獲得深刻印象，且對我國的行政與管理效率，極爲讚佩。美國林肯地政學會有意與我國合作設置一個土地改革訓練機構。經農復會多方協調爭取，該會於民國五十七年秋與我國正式簽訂合作合約，在桃園成立「土地改革訓練所」，由中美雙方負擔所需經費。我國應分擔的經費，由農復會及臺灣省地政局共同提供。

依據合約規定，該所最高決策機構爲理事會，在理事十一人中，我方佔六人，美方爲五人。現任主席爲農復會主任委員李崇道博士，共同主席爲美國林肯基金會總裁林肯博士。理事會以下設執行委員會，一般性的所務由執行秘書掌理，並分設教務、輔導、財務及總務四組。

土革訓練所每年春秋兩季舉辦爲期八週的農地改革班及市地政策稅務班各一次，並依照各國個別的需要，每年舉辦若干期短期班，每期二週至四週不等。此外，並邀請或安排各國有關決策高級人員，如部次長、省長、市長、局長等來華考察訪問一週至十日。

自民國五十八年四月間正式開班，至六十七年六月止，已舉辦正規班二十期，受訓人員共達五五七人，分別來自亞洲、南太平洋及中南美洲的三十三個國家及地區：巴貝多、玻利維亞、汶萊、哥倫比亞、柯克羣島、哥斯大黎加、厄瓜多爾、薩爾瓦多、斐濟、關島、瓜地馬拉、海地、宏都拉斯、印度、印尼、伊朗、高棉、韓國、馬來西亞、密克羅尼西亞、尼加拉瓜、巴拿馬、巴拉圭、菲律賓、所羅門羣島、斯利蘭卡、泰國、東加、烏拉圭、越南、西薩摩亞、聯合國糧農組織、中華民國。

短期班截至六十七年六月底止，已舉辦四十三期，受訓人員共五六〇人，分別來自哥倫比亞、哥斯大黎加、高棉、賴索托、菲律賓、泰國、越南、印尼、韓國、玻利維亞、薩爾瓦多及巴拉圭等國家。

1

Land Reform Training Institute

Through the Land Reform Training Institute (LRTI) at Taoyuan, Taiwan, the Republic of China has been sharing its successful experience in land reform with many other developing countries of the world. The idea for such an institute was first conceived at an international seminar on land reform, which was held in December 1967 in Taipei jointly by the John C. Lincoln Institute (later renamed Lincoln Institute of Land Policy) of the University of Hartford, U.S.A. and the Council for International Economic Cooperation and Development (CIECD) and JCRR, ROC. More than 40 international economists and land policy experts attended the seminar. They recommended, among other things, the establishment of a training program in land reform particularly for the developing countries in Asia. Through subsequent negotiations by JCRR, an agreement providing for the creation of LRTI was signed between the Lincoln Institute and CIECD in the fall of 1968. The first training session of LRTI began in April 1969.

Financing for the operation of LRTI comes from the Lincoln Institute on the American side, and JCRR and the Taiwan Land Bureau on the Chinese side. The Board of Directors of LRTI, the policy-making body, is presently co-chaired by Dr. Robert C. T. Lee, Chairman of JCRR, and Dr. David C. Lincoln, President of the Lincoln Foundation in the U.S.

Two kinds of training are provided by the institute: (1) the eight-week regular session, which is conducted once in the spring and once in the fall, focusing on agricultural land reform and urban land policy and taxation, respectively; and (2) the short-term course, which lasts from two to four weeks and is geared to the specific needs of individual countries. Arrangements are also made for the responsible officials of foreign countries to visit Taiwan and see the results of land reform here.

From April 1969 to June 1978, 20 regular sessions were held for a total of 557 participants from 33 countries and areas: Barbados, Bolivia, Brunei, Colombia, the Cook Islands, Costa Rica, Ecuador, El Salvador, Fiji, Guam, Guatemala, Haiti, Honduras, India, Indonesia, Iran, the Khmer Republic, the Republic of Korea, Malaysia, Micronesia, Nicaragua, Panama, Paraguay, the Philippines, the Solomon Islands, Sri Lanka, Thailand, Tonga, Uruguay, the Republic of Vietnam, West Samoa, FAO, and the Republic of China.

During the same period, a total of 560 participants attended 42 short-term sessions at the institute. They came from Bolivia, Colombia, Costa Rica, El Salvador, Indonesia, the Khmer Republic, the Republic of Korea, Lesotho, Paraguay, the Philippines, Thailand and the Republic of Vietnam.

2

3

1. 民國五十六年十二月在台北召開的土地改革研討會。
   The International Seminar on Land Taxation, Land Tenure and Land Reform in Developing Countries held in Taipei in December 1967.
2. 土地改革訓練所理事會主席李崇道向結業學員頒發結業證書。
   LRTI board chairman Robert C. T. Lee at the commencement of a regular training session.
3. 土地改革訓練所辦公大樓。
   Office building of the Land Reform Training Institute.

臺灣養豬科學研究所

農復會鑒於臺灣養豬事業的重要性，於民國五十九年三月與聯合國發展方案合作，在臺灣省苗栗縣竹南鎮成立臺灣養豬科學研究所。翌年十月我國退出聯合國後，經有關機關集會商討，決議由臺灣省政府、臺灣糖業公司及農復會分擔所需經費，支持此一研究單位繼續進行原訂各項工作。

該中心決策單位爲管理委員會，委員七人，包括經濟部、臺灣省政府、臺灣糖業公司及農復會代表，主任委員由農復會主任委員李崇道博士擔任。所長綜理所務，下設遺傳、病理、營養、生理、環境行爲、肉品加工等六系及行政室。

歷年在試驗研究方面已發現多項新病原，如豬流行性感冒及豬附紅血球蟲症等，並出版中英文家畜病理圖譜，已有國內外大學採用爲課本。成立種豬性能檢定站，加强推廣豬隻冷凍精液，更利用電腦作業，推行育種管理制度，並在所內首創環境及行爲系，研究各種管理方法對豬隻行爲的影響。

在訓練推廣方面，舉辦研討會一一〇次，訓練班四五次，參加人員達六千五百餘人。在國際合作方面，曾舉辦國際性研討會三次，派代表參加國外研討會議多次，並延聘外籍教授十九人來華指導或講學，對提高我國養豬科技水準，收效甚宏。

1

臺灣植物保護中心

臺灣植物保護中心於民國六十年七月成立，原爲我國與聯合國發展方案合作設置的機構。我國於同年十月退出聯合國後，聯合國發展方案即中止與我國的合作。經有關機關集會商討，決定由經濟部、臺灣省政府及農復會，依既訂的原則分擔所需經費，繼續執行原訂各項試驗研究計畫。

該中心決策單位爲管理委員會，委員七人，包括農復會、經濟部及臺灣省政府代表各一人，專家四人，主任委員爲農復會主任委員李崇道博士。研究部門設農藥殘量、農藥毒理、昆蟲、植物病理及植物生理等五組，中心業務由主任綜理。

中心成立初期假農復會辦公，並借用臺灣省農業試驗所、臺灣大學及衛生試驗所進行試驗研究工作。六十三年九月遷臺中縣霧峰新址，全面展開試驗研究工作。五年來共辦理研究計畫一一五項，其中在農藥及鼠害方面完成多項測定、分析、配方與污染防治研究，所獲結果已由臺灣省農林廳推廣應用。在病蟲害防治方面的研究工作主要集中於水稻、柑桔及桑樹等，以建立綜合性蟲害管理系統，已有顯著進展。在教育與訓練方面，曾會同有關機構辦理講習班及研討會多次。該中心的研究成果已大量節省農民施用農藥的成本，降低耗損，確保產量。

2

Pig Research Institute, Taiwan

In view of the importance of hogs in Taiwan's rural economy, JCRR cooperated with the United Nations Development Program in setting up in March 1970 a Pig Research Institute, Taiwan (PRIT) at Chunan, Miaoli. Following the Republic of China's withdrawal from the United Nations in October 1971, the institute has been operating with financial support from the Taiwan Provincial Government, the Taiwan Sugar Corporation and JCRR.

PRIT is supervised by a governing board composed of representatives of the agencies concerned and headed by JCRR Chairman Robert C. T. Lee. Its research is done through six departments: genetics, pathology, nutrition, physiology, environmental behavior, and meat processing.

Researchers at PRIT have over the years discovered a number of pathogens that cause such diseases as swine influenza and eperythrozoonosis. A book, *Atlas of General Pathology with Special Reference to Swine Diseases*, compiled in collaboration with Dr. John M. King of Cornell University and published with JCRR assistance, has been used as a textbook by several universities at home and abroad. The institute has also set up a breeding pig testing station, promoted the use of frozen semen, introduced computerized breeding management, and launched a study of the effects of various management practices on the behavior of pigs.

Among the institute's other activities are the conduct of training courses and promotion of international cooperation by holding or participating in international seminars and inviting foreign professors for teaching and consultation.

Plant Protection Center

Founded in July 1971 and also originally a cooperative project between the Republic of China and the United Nations Development Program, the Plant Protection Center (PPC) has been supported with funds from the Ministry of Economics Affairs, the Taiwan Provincial Government and JCRR since October 1971.

The Center is located at Wufeng in Taichung county. With a governing board chaired by Dr. Robert C. T. Lee, the Center undertakes research in the fields of pesticide residues, pesticide toxicology, entomology, plant pathology, and plant physiology.

A total of 115 research projects have been carried out to date. Improved methods of rodent control and pesticide application developed by the Center have been widely adopted by the farmers. Significant progress has been made in the establishment of integrated pest management and forecasting systems for rice, citrus fruits and mulberries. To popularize its research findings and promote the cause of plant protection, the Center has conducted quite a number of workshops in cooperation with other agencies.

3

1. 養豬科學研究所。
   The Pig Research Institute, Taiwan, at Chunan.
2. 台灣植物保護中心辦公暨實驗大樓。
   Office/laboratory building of the Plant Protection Center.
3. 台灣植物保護中心研究人員進行水稻蟲害調查。
   Research workers at PPC checking insect damage to rice.

東港養蝦中心

民國五十五年，美國洛氏基金會撥款美金十五萬元，委託農復會辦理養殖漁業研究計畫，經於五十七年在東港設立一個養蝦中心，附屬於臺灣省水產試驗所。翌年十月正式開始蝦苗及各種經濟魚類的人工繁殖試驗研究。

東港養蝦中心於六十年易名臺灣省水產試驗所東港分所。九年來先後在洛氏基金會、農復會、國科會及中央加速農村建設補助計畫項下協助充實其設備，增建房舍，並進行各項研究計畫，成果豐碩。該分所的重大成就之一爲領先世界各國完成烏魚人工繁殖試驗及烏魚完全養殖。此外並完成七種經濟海產蝦類及泰國淡水大蝦的人工繁殖試驗，奠定了臺灣現有逾百家蝦苗繁殖場及近千公頃養蝦事業的生產基礎。

亞洲農業技術服務中心

財團法人亞洲農技服務中心，係由亞洲商工聯合會在農復會技術協助下於民國五十八年在臺北設立，目的在促進亞洲國家民間的農業技術交流，除中心主任由農復會高級人員兼任外，並提供辦公室及人員，兼辦其業務。

亞洲農技服務中心經常應亞洲地區民間詢索，提供養鷄、飼料配製、洋菇栽培、果樹種植、作物生產、淡水養魚等方面的技術性資料。此外並代辦農地利用可行性勘查及規劃，而以六十一年勘查印尼哈爾瑪哈拉島的四萬公頃原始林，六十三年在印尼石油公司所屬十六萬公頃農地進行的勘查工作規模較大。

東港水產試驗分所。 The Tungkang Marine Laboratory.

Tungkang Marine Laboratory

The Tungkang Marine Laboratory of the Taiwan Fisheries Research Institute, formerly known as the Tungkang Shrimp Culture Center, was established in 1968 under one of the fish culture research projects funded by the Rockefeller Foundation and administered by JCRR. The laboratory started its research on shrimp and fish propagation in October 1969 after construction of a small laboratory was completed.

During the past nine years, the facilities of the laboratory have been extensively strengthened and some very fruitful research results have been obtained. Among the most significant achievements are the mass production of mullet fry by artificial spawning and the development of artificial propagation of shrimp which has brought into being today's more than 150 commercial shrimp hatcheries and 1,000 ha of shrimp ponds in Taiwan.

Asian Agricultural Technical Service Center

To promote agricultural technical interchange in the private sector among Asian countries, the Asian Agricultural Technical Service Center (AATSC), a non-profit organization affiliated with the Confederation of Asian Chambers of Commerce and Industry, was established in Taipei in 1969 with JCRR support. A senior JCRR official serves concurrently as the superintendent of AATSC. JCRR also provides AATSC with office space and secretarial help.

AATSC receives regularly inquiries about such technical matters as poultry raising, feed formulation, mushroom culture fruit growing, crop production, eel and fresh-water fish culture, etc. Answers to the enquiries are made with the help of JCRR specialists.

At the request of its Indonesian clients, AATSC conducted two land-use survey and planning projects in 1972 and 1974 respectively. The first project covered 40,000 ha of uncultivated land on Halmahera island, and the second project, involving a feasibility study of rice growing, was carried out on a 160,000-hectare estate of the Indonesian state-owned oil company, the Pertamina.