臺灣糖業研究所

TAIWAN SUGAR RESEARCH INSTITUTE

行政大樓
Administration Building

沿革與任務

台灣糖業之試驗研究，開始於民國前11年，最初在台南縣麻豆鎮設立甘蔗試作場，民國二十一年擴大規模，改稱爲台灣糖業試驗所，並移設於台南市現址。民國三十四年台灣光復後初隸屬於台灣省政府，民國三十七年交由台灣糖業公司接辦。民國六十二年五月改稱爲台灣糖業研究所。

本所爲發展台灣糖業，負有下列各項任務：㈠育成甘蔗新品種，提高單位面積產糖量，㈡縮短甘蔗生育期，改善蔗園間作經營，㈢提高台糖公司自營農場土地生產力，㈣提高糖廠製糖效率，改進砂糖品質，㈤研究副產利用，發展多角經營。

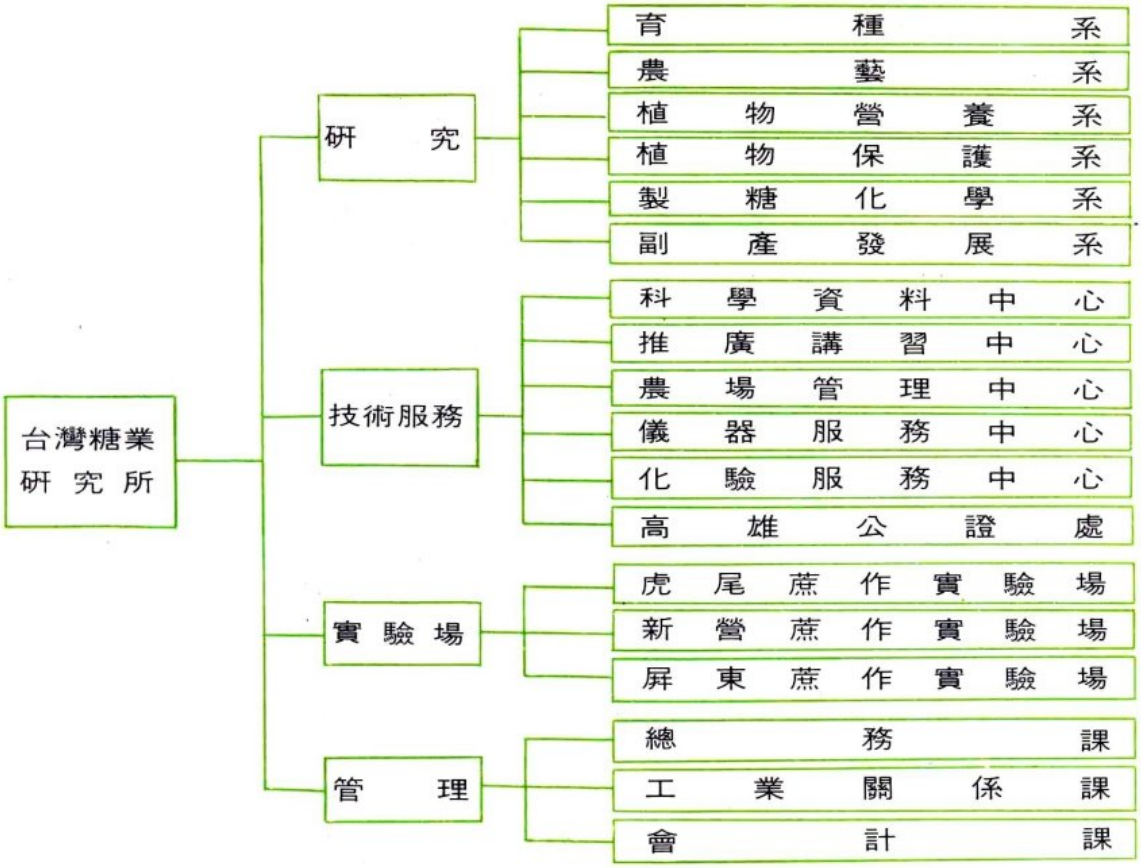
HISTORY

The Taiwan Sugar Research Institute (formerly known as the Taiwan Sugar Experiment Station) has a comparatively long history. It was established in 1901 during the Japanese occupation of Taiwan. After the restoration of Taiwan to the Republic of China in 1945, the Institute came under the jurisdiction of the Taiwan Provincial Government. It was incorporated into the Taiwan Sugar Corporation in 1948.

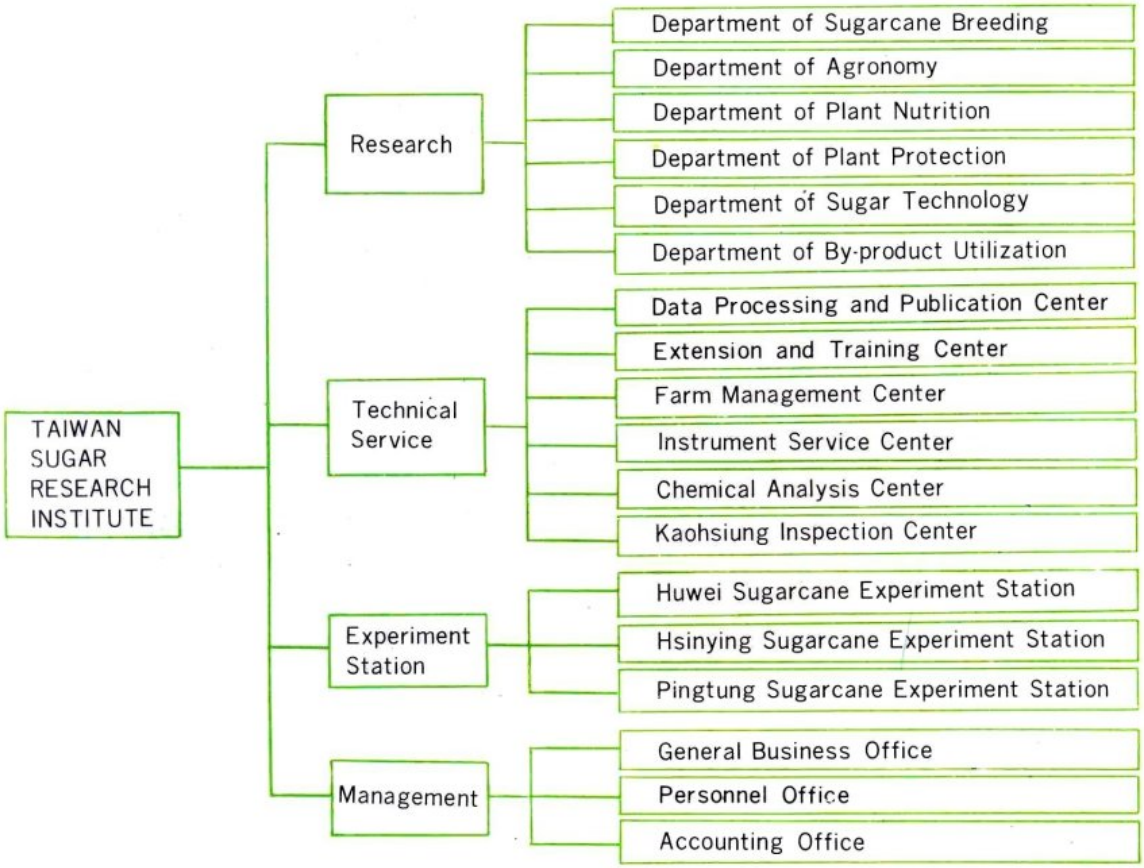
The basic objective of the Taiwan Sugar Research Institute is to promote the Taiwan sugar industry. The research program is designed to meet the needs of an expanding sugar industry and has its emphasis focused on the following areas: breeding new cane varieties with higher sugar yield, shortening the growing period of sugarcane by improving cultivation techniques, improving intercropping techniques for intensive land utilization, increasing the productivity of cane lands, increasing the efficiency of sugar processing, improving the quality of the sugar produced, utilizing by-products and developing diversifications of the industry.

研究大樓
Research Building

組　織



ORGANIZATION

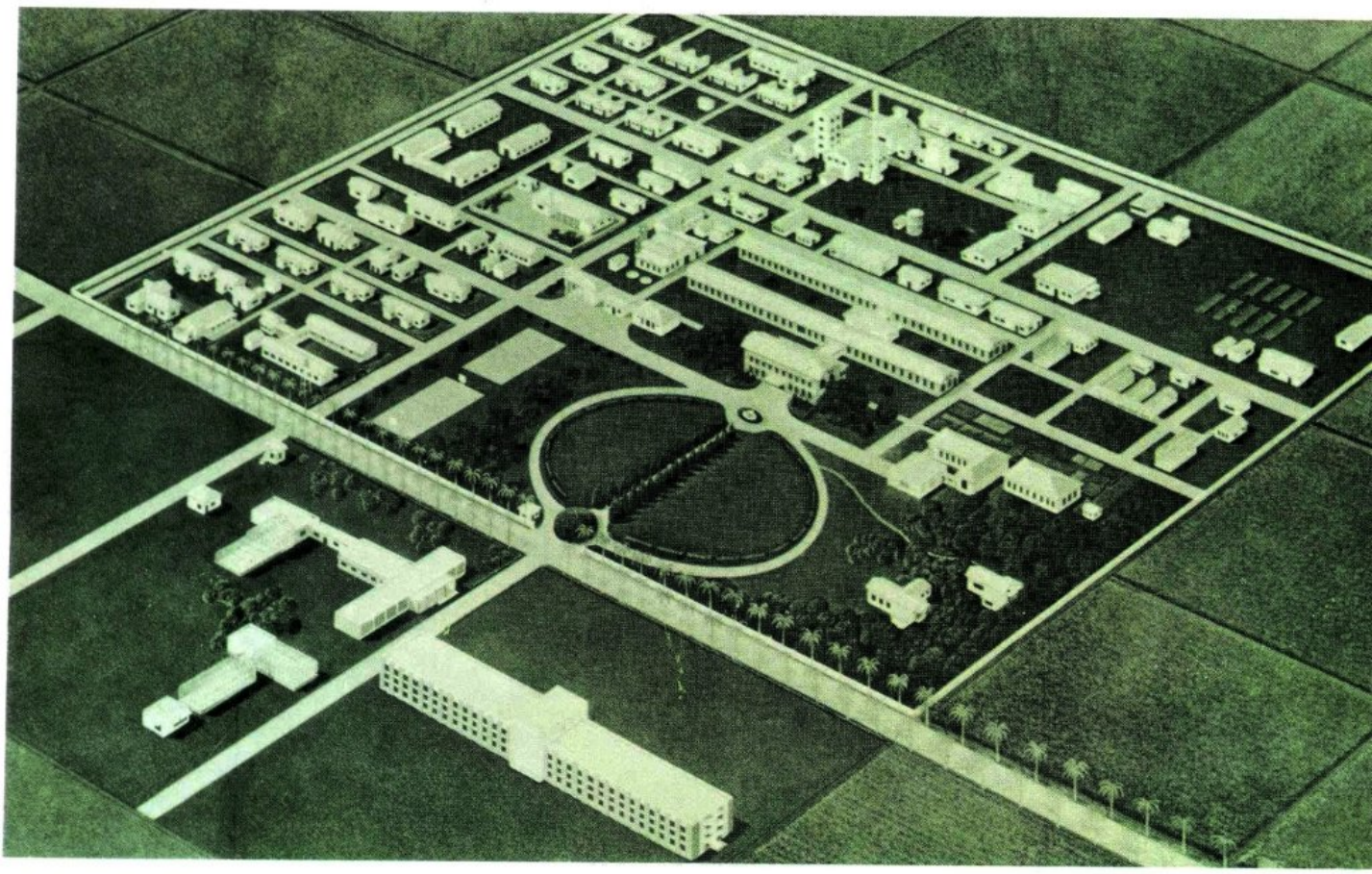


人　　員

本所人員計 400 名，其中包括研究人員150名，技術人員190名，及管理人員60名。

STAFF

The institute has a total staff of 400 including 150 degree-holding researchers, 190 technicians, and 60 managerial personnel.

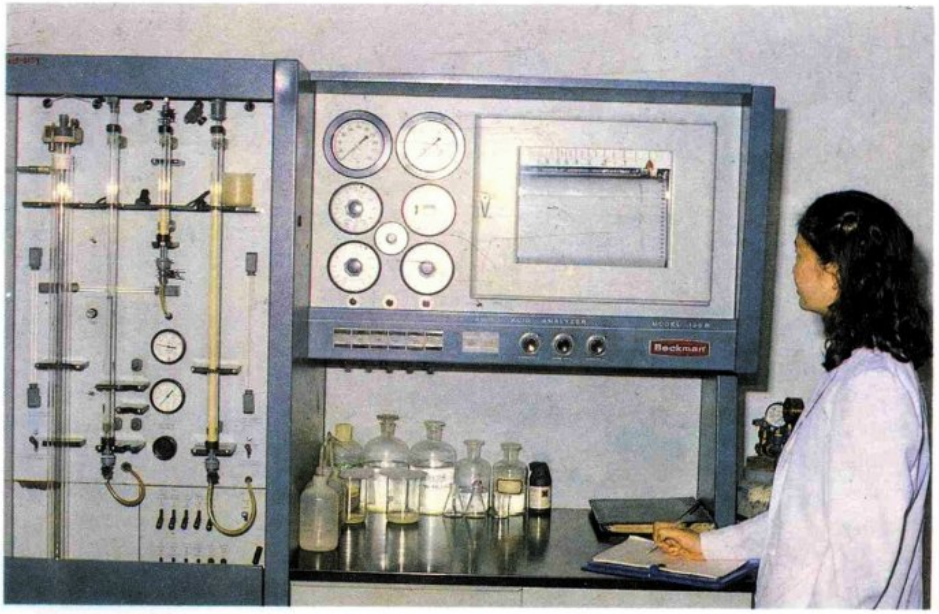


本所全景圖
A panorama of TSRI.

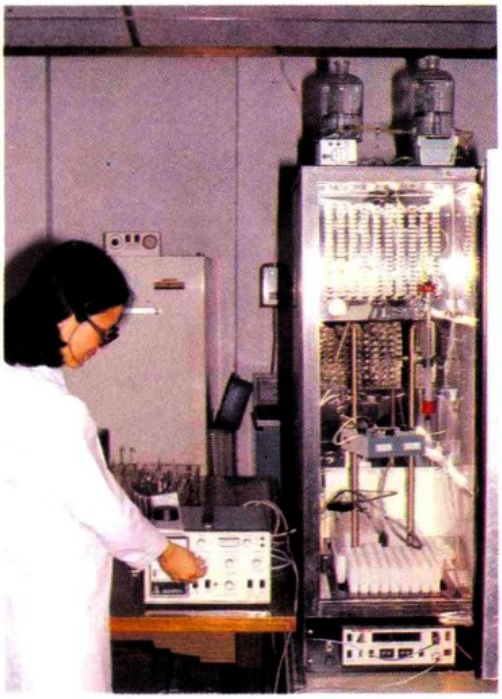
設　　備

本所各項設備，在歷年不斷增加或更新下，更顯充實，並已甚具規模。各項建築物佔地約12公頃，規劃整齊之試驗農場計約 375 公頃。圖書館藏書達四萬餘册，經常訂閱之中外科學雜誌共計 374 種。現代化科學研究儀器共計 2,539 件，其中不乏珍貴之精密儀器，茲舉其重要者如下：自動分光比色儀，原子吸光分光儀，自動分析儀，自動糖度旋光儀，分子量測定儀，氣體分析儀，氨基酸分析儀，液體閃爍分光儀，X光繞射儀，螢光測定儀，示波儀，冷凍乾燥機，低溫高速離心機，超顯像顯微鏡，位相差顯微鏡，紙漿叩解機，小型電腦。

根系觀察室附有自動遮雨棚。
A view of Root Observation Laboratory with automatic moveable shelters.



用胺基酸分析儀檢定蛋白質之胺基酸組成
Determining amino acids of protein with Amino Acid Analyzer.



葡萄糖異構化酵素之分離
Isolation of glucose isomerase.

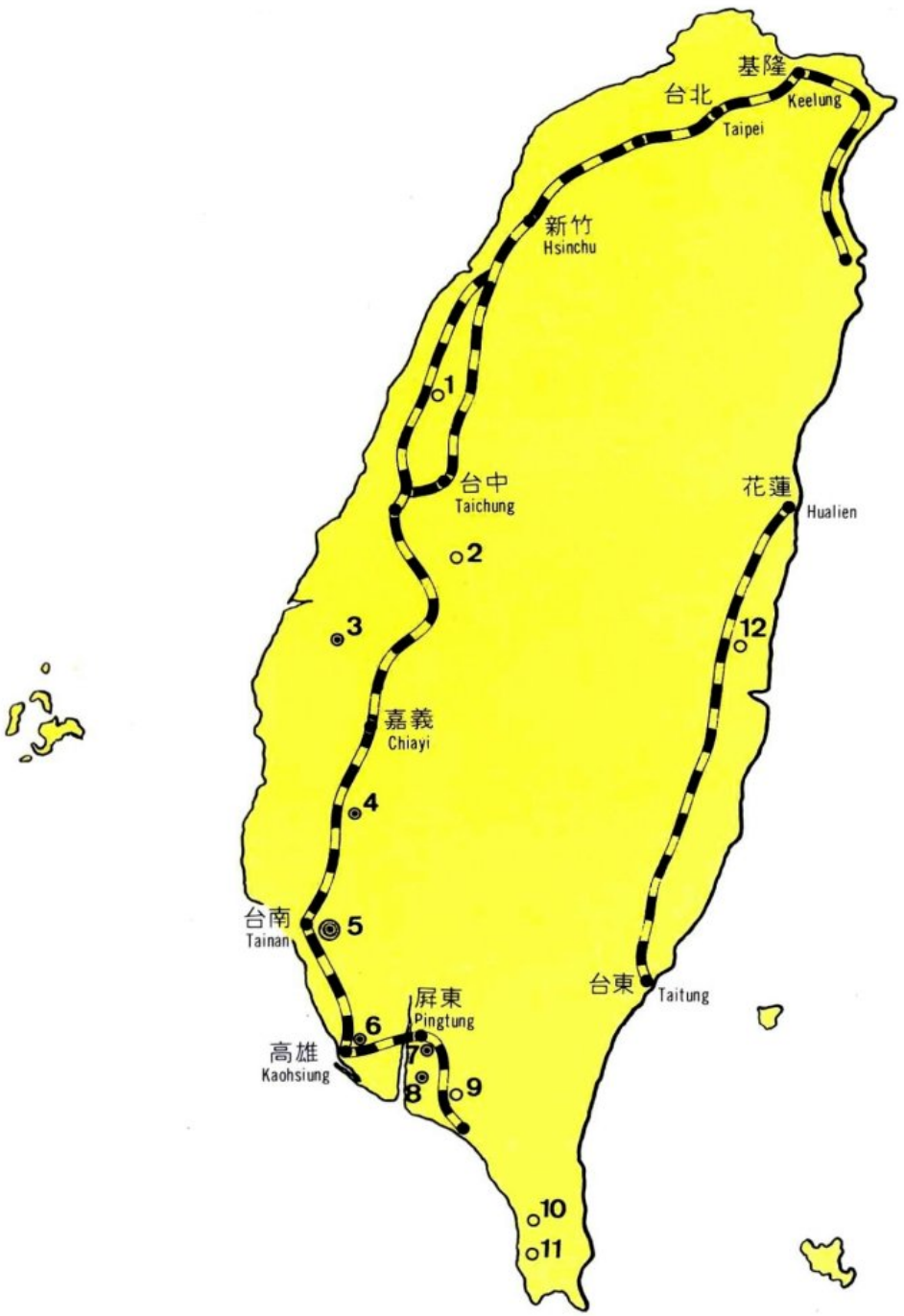
塑膠閥門軟管灌溉情形
Applying gated-pipe irrigation method in sugarcane field.

FACILITIES

Through the years of continual expansion the Taiwan Sugar Research Institute has multiplied in size. The buildings of the institute occupy about 12 hectares while an additional 375 hectares of experimental farms with roads, irrigation ditches and pump stations are also owned by the Institute. To provide the researchers with up-to-date scientific information, the institute has a library containing more than 40,000 books of scientific reference and also subscribes to 374 periodicals from around the world. The implements of research are an integral part of research and every effort has been made to obtain the best available instruments and scientific equipment for the Institute. Therefore, the institute has a very adequate supply of modern scientific implements. Among the more sophisticated are: automatic ultraviolet spectrophotometer, atomic absorption spectrophotometer, continuous auto-analyzer, automatic sugar polarimeter, molecular weight apparatus, gas analyzer, amino acid analyzer, liquid scintillation spectrometer, X-ray diffractometer, electronic photoflorometer, oscilloscope, freezing dryer, refrigerated ultra-centrifuge, ultra-photo microscope, phase contrast microscope, PFI MILL, mini-computer, etc. Although the Taiwan Sugar Research Institute is growing in many ways, this growth is carefully controlled and guided by the precept of quality as distinguished from sheer quantity.

本所附屬機構分佈圖

LOCATION OF BRANCH UNITS OF TSRI



1. 后里甘蔗育種站 Houli Sugarcane Field Station
2. 南投甘蔗露菌病測定圃 Nantou Sugarcane Downy Mildew Testing Nursery
3. 虎尾蔗作實驗場 Huwei Sugarcane Experiment Station
4. 新營蔗作實驗場 Hsinying Sugarcane Experiment Station
5. 台灣糖業研究所 Taiwan Sugar Research Institute
6. 高雄公證處 Kaohsiung Inspection Center
7. 屏東蔗作實驗場 Pingtung Sugarcane Experiment Station
8. 萬丹甘蔗育種場 Wantan Sugarcane Breeding Station
9. 昌隆甘蔗育種站 Changlung Sugarcane Field Station
10. 四重溪黑穗病抗病測定圃 Szuchungchi Sugarcane Smut Disease Testing Nursery
11. 恒春甘蔗交配圃 Hengchun Sugarcane Crossing Nursery
12. 花蓮甘蔗育種站 Hualien Sugarcane Field Station

出 版 物

㈠台灣糖業研究所研究彙報

本所各項試驗研究之正式報告，於本所研究彙報刊佈，每年出版四期，以供台糖公司各生產單位參考應用，並與國內外各學術研究機構交換。

㈡台灣糖業研究所年報

報導本所一年內主要研究成果及技術服務概況，以英文刊行。

㈢糖業文摘選譯

國外最近發表有關糖業研究文獻摘要譯成中文，每月出版一期，以供台糖公司各生產單位參考。

㈣技術專刊

有關甘蔗農業及製糖工業之研究結果，作一系列之專題介紹。

PUBLICATIONS

1.Report of the Taiwan Sugar Research Institute.

This is an official publication of all the research conducted at this institute, published in Chinese with English translated abstracts. Four issues are published in a year.

2.Annual Report of the Taiwan Sugar Research Institute.

The annual report is published in English relating some of the more significant research conducted and achievements of the year.

3.Selected Translations of Sugar Research Papers.

This publication contains the Chinese translations of some of the more important research papers in the sugar sciences. It is published monthly and is distributed to all of the plantations and sugar mills of the Taiwan Sugar Corporation for references.

4.Monographs.

This publication on special subjects in the sugar sciences is published whenever deemed necessary.

研 究 發 展

甘蔗新品種F178, 強抗葉枯病、黑穗病，宜於屏東、南州及小港地區栽培。
A new sugarcane variety F178 highly resistant to leaf blight and smut disease, has been released for general planting in Pingtung, Nanchow and Shiaokong districts.

主要研究成果：

1. 光復以來育成甘蔗新品種44個(F135-F178)，目前“F”品種佔台灣甘蔗總栽培面積之98.5%。
2. 研究甘蔗組織及細胞培養，輔助新品種之育成。
3. 採集原產本省與甘蔗近緣之茅屬植物，利用其新血統以加強甘蔗品種之改良。
4. 建立甘蔗宿根栽培制度，減低生產成本，提高土地利用率。
5. 倡導甘蔗間作栽培，增加農民收益。
6. 在砂礫地蔗田於地下50公分處全面舖設一層約10公分厚之粘土層，保水保肥，有顯著增產效果。
7. 發展暗渠排水系統，有效改良鹽分地。
8. 應用塑膠閥門軟管灌溉方法，效果優異。

甘蔗實生苗假植（每年培育約60萬株）
Young sugarcane seedlings in the beds. (approximately 600,000 seedlings raised each year)

RESEARCH AND DEVELOPMENT

Some Research Achievements

1. A total of 44 sugarcane varieties (F135 to F178) have been named in the "F" series since 1945. Currently, F series varieties account for 98.5% of the total sugarcane plantings in Taiwan.
2. Establishing tissue and cell culture of sugarcane as a new approach in sugarcane breeding.
3. Collecting and using the *Miscanthus* germplasm native to Taiwan in sugarcane breeding.
4. Establishing ratooning method after new planting to form an integral cultivation system that has greatly contributed to lowering the cost of production of sugarcane.

利用光期室縮短日照促進甘蔗開花，以作雜交親本。
Inducement of sugarcane flowering for crossing program by aid of the photoperiodic house.

5. Establishing intercropping for greater utilization of land.
6. The development of a technique to increase the productivity of sandy soil by transferring a 10 cm thick layer of clay soil to a depth of 50 cm under the sandy field to serve as an impermeable layer for the retention of water after rainfall or irrigation.
7. A procedure for designing the subsurface tile drainage system which reclaim saline soils most effectively in Taiwan was developed.
8. A gated-pipe irrigation method was recommended in use to increase the efficiency of irrigation.

由甘蔗分生組織培育幼苗。
Sugarcane seedlings raised from tissue culture.

9. 應用藥劑控制蔗園雜草，節省勞力。
10. 完成台糖公司45,000餘公頃自營農場之土壤調查及肥力普查，資料納入電腦處理，作爲土地改良，推薦磷鉀肥施用量及補充其他養分之依據。
11. 應用甘蔗葉片分析，機動調整氮肥施用量。
12. 進行甘蔗新品種抗病性測定，有效控制露菌病、黑穗病、葉枯病、白葉病及嵌紋病等重要病害。
13. 建立寄生性線蟲調查及防治系統。
14. 推廣赤眼卵寄生蜂防治蔗螟，效果優異。
15. 確定蔗龜、金針蟲等地下害蟲之經濟爲害臨界點，推薦特樂可、賽滅得、抗蟲得等粒劑防治其發生。
16. 究明蔗園野鼠之種類、組成、及活動範圍，推廣應用殺鼠靈及磷化鋅加腊毒餌。
17. 碳酸法糖廠之飽和操作由間歇式發展爲連續式，已推廣應用，增進作業穩定性，沉澱迅速，節省人工。
18. 以澱粉爲原料，利用葡萄糖異構化酵素製造高果糖糖漿成功。

爲提高清淨操作效率及穩定白糖品質，串聯單槽發展成功之連續式炭酸飽和，已在推廣中。
Continuous carbonator, successfully developed in Towliu Sugar Factory, promotes the clarification efficiency and produces better white sugar

9. The application of new herbicides for effective control of weeds in sugarcane fields.
10. The mapping and grouping of the 45,000 ha of TSC plantations into 104 soil management groups based on their soil properties. A whole survey of the soil fertility status of TSC plantations has been also completed and used as an index for the application of P and K fertilizers and the reclamation of land.
11. Establishing sugarcane leaf analysis to determine the amount of nitrogen fertilizers to be applied to sugarcane lands.
12. Effective control of downy mildew, culmicolous smut, leaf blight, white leaf, and mosaic diseases by determining the disease resistance of all new sugarcane varieties to be released.
13. Establishing the system of parasitic nematode survey and control.
14. Commercial release of *Trichogramma australicum* for control of sugarcane borers in Taiwan.
15. Effective control of wireworm and white grub with Terracur P, Thimet, and Counter granules and establishing the economic injury threshold of the soil insects.
16. Clarifying the species, composition, and home ranges of wild rats in sugarcane fields; commercial release of waxed warfarin and zinc phosphide baits for control the wild rats.
17. Development of a new continuous carbonation process superior to the batch carbonation process formerly used in sugar manufacture. The merits of the new process are simple and smooth in operation and requiring less skilled operators.
18. A process of producing high fructose syrup from cassava starch hydrolysate catalyzed by glucose isomerase has been developed.

利用糖蜜爲原料，以 400 及1000公升醱酵槽製造離胺酸，可供飼料補充物。

The L-lysine has been produced from molasses by fermentation process with 400-liter and 1000-liter fermentors. The crude product with either 10% or 25% lysine can be used as a feed supplement.

19.利用糖蜜製造離胺酸成功。

20.利用蔗糖以醱酵法製造高粘度之工業膠(微生物膠)，可供食品工業及開鑿油井之用。

21.以酒精廢醪製造酵母成功，已在新營副產加工廠應用。

22.推廣蔗渣濕式散堆儲存法，確保蔗渣品質不變，避免火災。

白葉病（上左）、黑穗病（上右）、露菌病（下）爲害甘蔗情形。
Damage of sugarcane caused by white leaf disease (above left), culmicolous smut disease (above right) and downy mildew disease (below).

甘蔗紫螟之新天敵棘姬小蜂。
The fact that parasitic *Tetrastichus inferens* oviposits on the pink cane borers is utilized for biological control.

19. A fermentation process for the production of L-lysine from molasses has been well established. The crude product with either 10% or 25% lysine can be used as a feed supplement.
20. Industrial gum (microbial gum) with high viscosity has been successfully produced from cane sugar by fermentation process. It can be used as a food additive and a substitute for bentonite in oil well drilling.
21. A process for the production of *Torula utilis* yeast from alcohol slops has been developed and applied in Shinying By-product Factory.
22. A method of wet bagasse storage in bulk form has been developed and applied in Pingtung Pulp Factory with the advantage of preventing deterioration and eliminating fire hazard.

蔗園空噴成熟劑
Aerial spraying of ripeners on sugarcane field.

甘蔗間作玉米及矮生型作物如葱、蒜、白蘿蔔、胡蘿蔔等，擴大土地利用。
Sugarcane interplanted with corn and dwarf crops such as onion, garlic, radish, carrot, etc. for greater utilization of land.

爲害甘蔗之五種野鼠。
The five species of wild rats found menacing in Taiwan sugarcane fields.

今後研究重點：

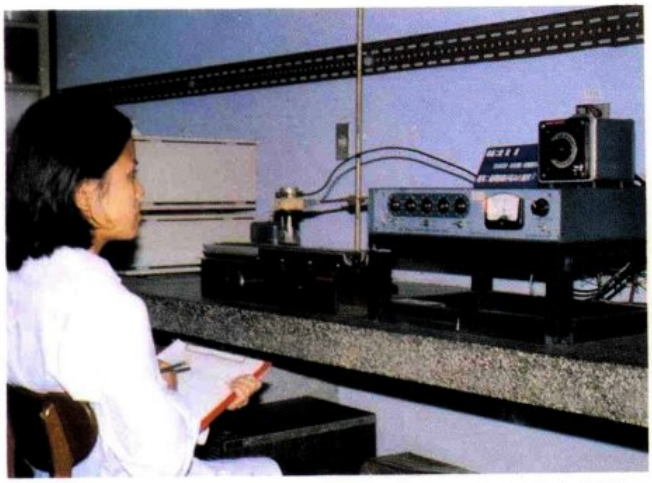
1. 推行甘蔗分區選種，育成適於不同風土區栽培之優良品種。
2. 加強農機具之研究發展，推行蔗田一貫作業機械化。
3. 開發地下水源及建立合理灌溉系統。
4. 研究肥料最適當之施用時期，施用方法及施用量。
5. 豬糞尿、廢水及污泥之處理與利用。
6. 加強防除蔗園病、蟲、鼠害。
7. 加強蔗田藥劑除草。
8. 改進製糖程序，發展製糖操作系統自動化。
9. 發展砂糖下游產品。
10. 副產品（糖蜜、蔗渣）之有效利用。
11. 配合政府政策，協助其他農作物之研究。
12. 加強國際科學合作研究。

利用蔗渣或蔗髓製造木糖
Saccharification of bagasse to produce xylose in a pilot plant.

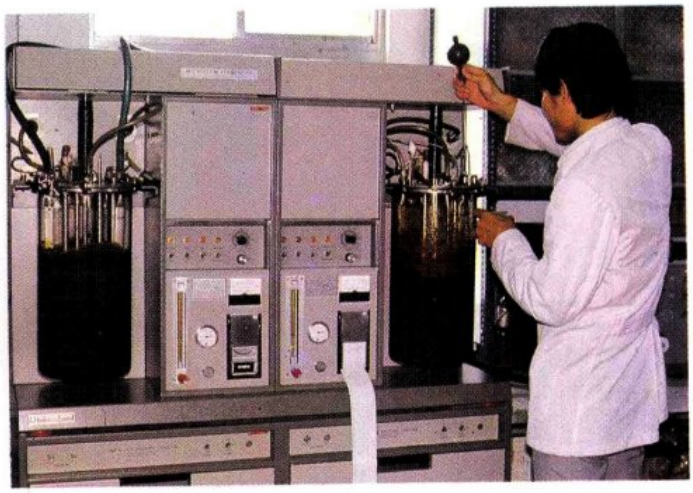
農機具實習工場
Farm machine practicing and training shop.

Research Programs Currently Being Emphasized

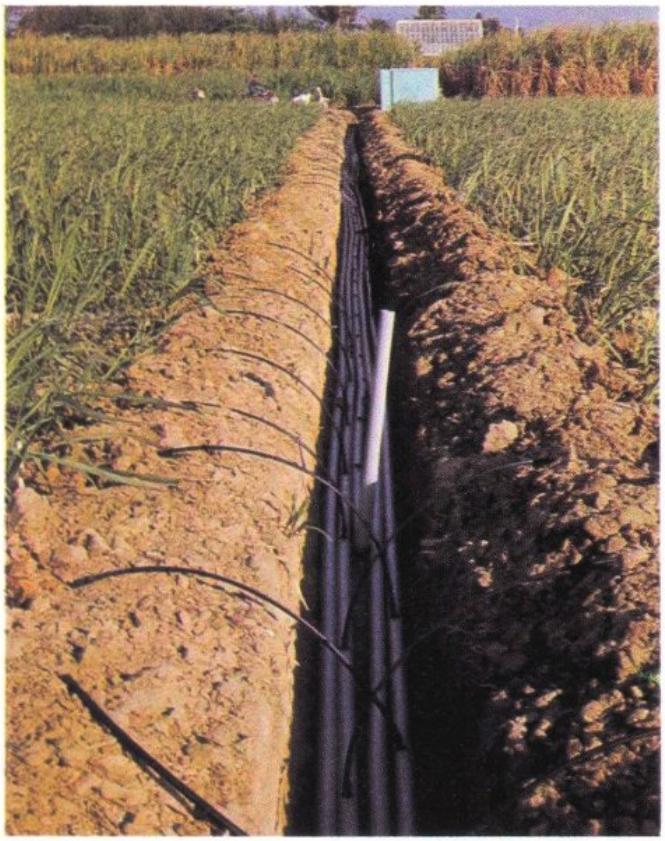
1. Regional selection of sugarcane varieties based on adaptability to differing soil and climatic conditions.
2. Developing farm machines for the complete mechanization of sugarcane cultivation.
3. Developing and using ground water resources and establishing an irrigation system for the Taiwan Sugar Corporation plantations.
4. Optimum fertilization of sugarcane.
5. Disposing and utilizing the hog manure, waste water and sludge on sugarcane fields.
6. Control of sugarcane diseases, insect pests, and field rats.
7. Chemical weed control.
8. Improving and automating the sugar manufacturing process.
9. Developing down-stream products from sucrose.
10. Utilization of by-products (molasses, bagasse).
11. Conducting of research on other agricultural crops to fully utilize the Institute's facilities at the request of the Government.
12. International co-operation in agricultural and sugar technological researches.



應用放射性同位素掃描法，研究標識P-32之片狀肥料在土柱中之移動距離
The movement of P in tagged tablet fertilizer by use of the radioisotope scanning method in a soil column.



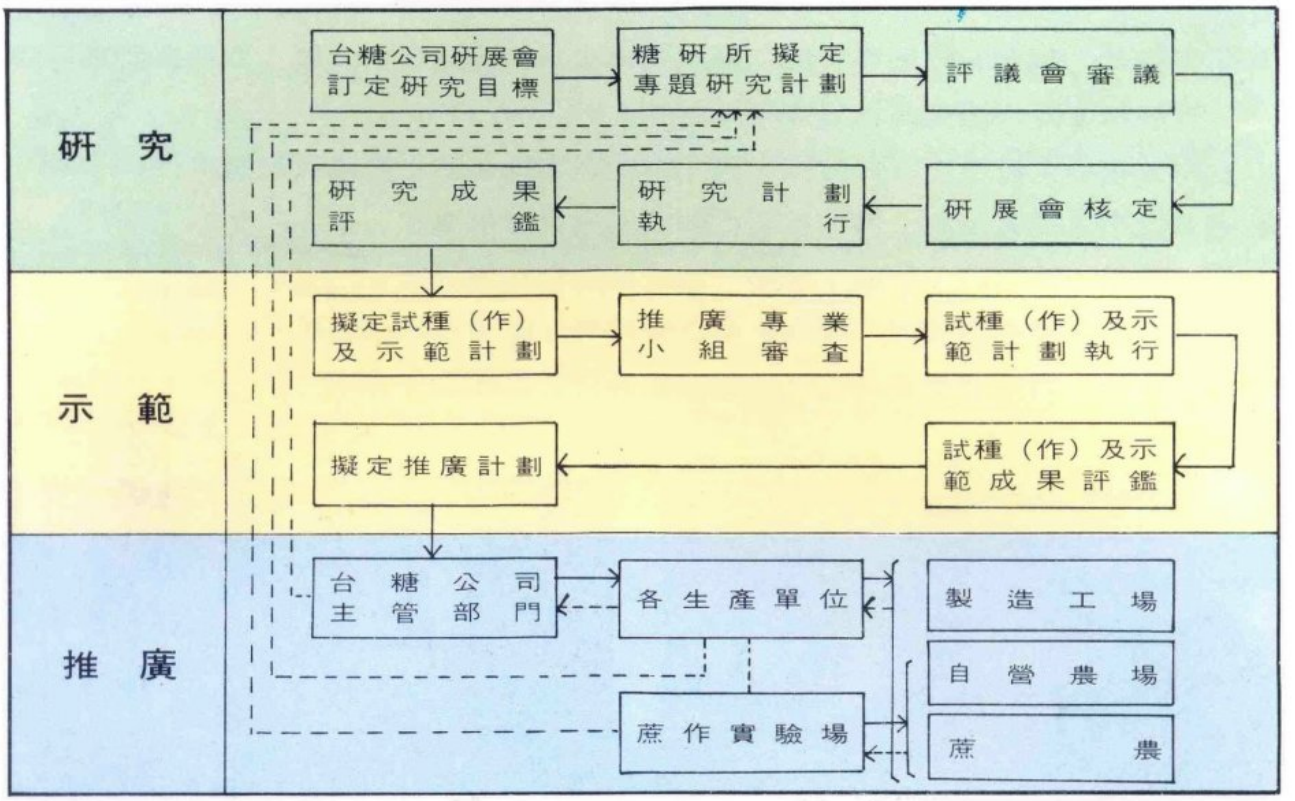
糖蜜酵母之培養
Cultivation of yeast on cane molasses.



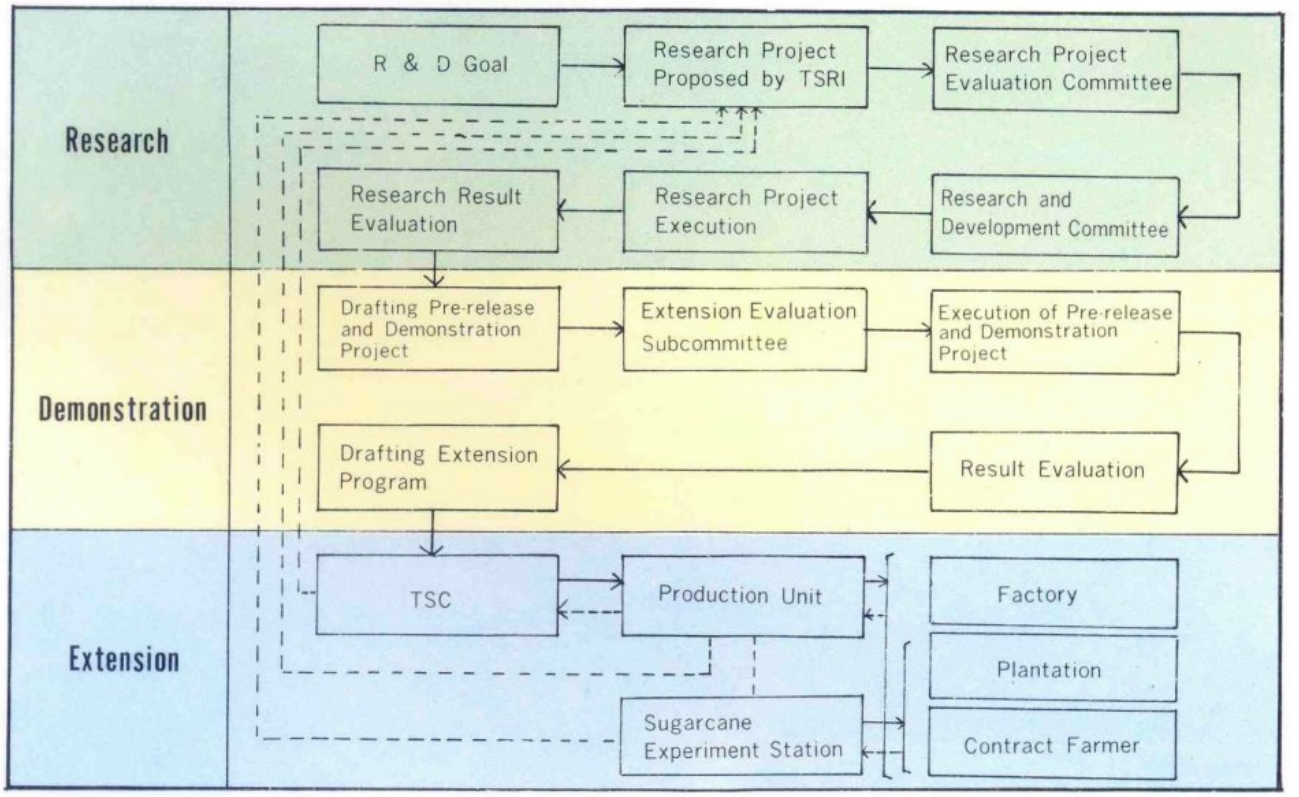
蔗園滴水灌溉
A view of drip irrigation system in sugarcane field.

地下暗管排水系統改良鹽分地
A subsurface tile drainage system used for reclaiming saline land.

台灣糖業研究發展系統



RESEARCH AND DEVELOPMENT SYSTEM FOR TAIWAN SUGAR INDUSTRY



技 術 服 務

1.研究資料之蒐集，分析與整理；研究刊物之編輯，出版與分發；圖書雜誌之訂購，管理與借閱；研究題材之攝影服務。

2.台糖公司各生產單位儀器檢修服務；本所研究用儀器之訂購與維護。

3.研究成果之推廣示範；辦理各項技術訓練與實習指導。

4.製糖原料，產副品，土壤，植體，水質等之化驗與分析。

5.試驗農場之規劃與管理；優良猪種之繁殖與分配。

6.辦理台糖公司外銷產副品及進口大宗物料之公證業務。

圖書館
The Library.

圖書館書庫一角。
A view of the library stack room.

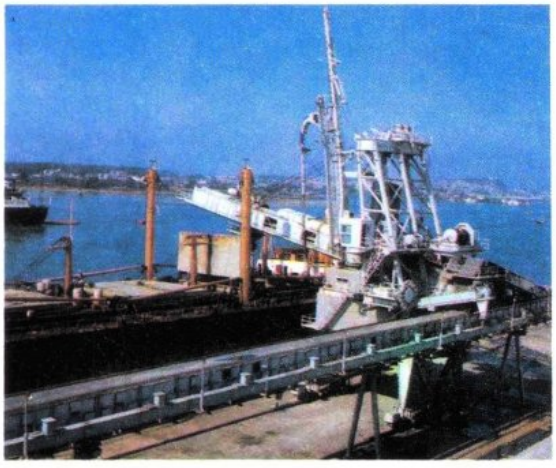
由儀器中心主持設計安裝在高雄總廠之製糖中央自動管制系統。

The central control system for automatizing sugar manufacturing process was designed and installed by the Instrument Service Center of TSRI at Kaohsiung Sugar Factory.

TECHNICAL SERVICES

1. The Data Processing and Publication Center is responsible for the collection, classification, storage, and analysis of research data: the editing, publication, and distribution of research papers; and the management of the institute's technical library and the photograph processing laboratory.
2. The Instrument Service Center is responsible for the purchase, maintenance, and repair of all the instruments of the Taiwan Sugar Corporation.
3. The Extension and Training Center is responsible for the extension of the products of our research and the training of technicians.
4. The Chemical Analysis Center is responsible for the analysis of any material concerned with the sugar industry.
5. The Farm Management Center is responsible for the management of the institute's experimental farms including a hog ranch and the beautification of the institute's grounds.
6. The Kaohsiung Inspection Center is responsibe for the inspection of the ordered imported materials and the products of the Taiwan Sugar Corporation to be exported.

用原子吸光分光儀測定土壤，灌溉水，植體，蔗汁及砂糖中各種陽離子成分。
Atomic absorption spectrophotometer used for quantitative analysis of cation components in soils, water, plant tissues, cane juice, sugar, etc.



高雄公證處辦理外銷砂糖公證業務
TSC sugar being inspected by Kaohsiung Inspection Center of TSRI for export.

曳引機掛碟犁、迴轉犁等農具在田間實習訓練情形。
Technicians being trained in operating tractors attached with implements in sugarcane field.

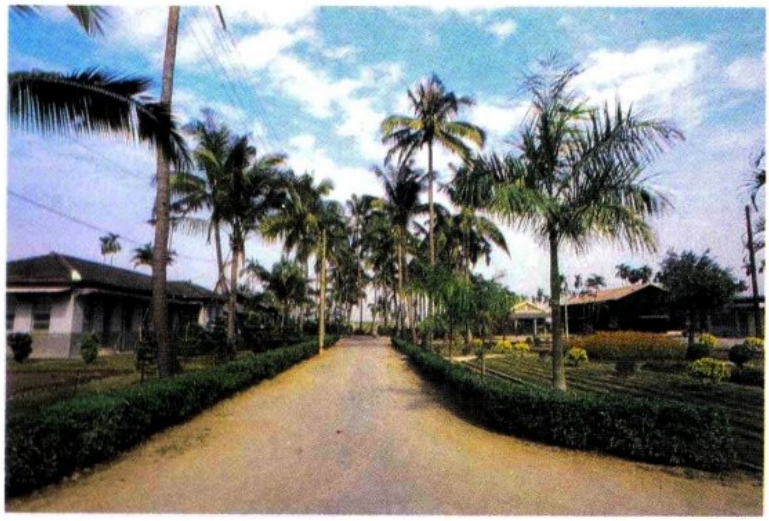
實　驗　場

本所於虎尾、新營、屏東三地各設置蔗作實驗場，分別負責其所在地區糖廠有關品種、農藝、植物保護等研究成果之示範，宣導與推廣；各項區域性試驗之執行；新品種蔗苗之繁殖與檢疫；氣象觀測與資料整理；特殊區域性問題之研究。

EXPERIMENT STATION

This institute has three experiment stations located in the districts of Huwei, Hsinying, and Pingtung. These stations are responsible for the extension, demonstration, training, the multiplication of newly released sugarcane varieties, and the collection of local climatic data in their respective district. Some researches are also conducted to solve local problems.

新營蔗作實驗場
A view of the Hsinying Sugarcane Experiment Station, TSRI.



萬丹育種場
A view of the Wantan Sugarcane Breeding Station, TSRI.

本所庭園
A scenic spot at TSRI. The sugar crystal is a symbol of our sugar industry.

同位素館
Radioisotope Laboratory.

農訓中心
The Agricultural Training Center

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