

摘 要

96 年度本場共執行科技研究計畫 49 項，示範推廣計畫 21 項，接受委託計畫 21 項，茲將摘要擇錄如下：

稻作：高級試驗選出優良水稻品系花稔育 99 號參加 97 年區域試驗。水稻豐歉試驗兩期作試驗結果，各品種均較歷年減產。建立水稻現行品種優質栽培生理指標試驗，插秧至成熟期平均積溫及日射量一期作分別為 1,764.6°C-day 及 1,620.6MJ/m²。台灣地區良質米品種適地優質標準操作程序試驗之結果顯示，第一期作不同栽培密度與播種量之處理，以播種量 160 公克及栽培密度 30 公分×30 公分之處理表現較佳。新品種示範分別於花蓮縣玉里鎮、花蓮市、富里鄉及宜蘭縣宜蘭市、員山鄉進行，示範品種為桃園 3 號、桃園 4 號、台農 74 號、台農 75 號。有機米產銷班經營輔導方面，花蓮地區一、二期作輔導花蓮市、玉里鎮及富里鄉等 6 班共 598 公頃；宜蘭地區一期作輔導礁溪鄉、三星鄉及羅東鎮 4 班共 73 公頃。於花蓮縣富里鄉、玉里鎮及宜蘭縣五結鄉輔導設立稻米產銷專業區七處，全年執行面積 2,088 公頃。

雜糧：落花生區域試驗春作以南改系 176 號及農育 56 號，秋作以農育 55 號等之表現較佳。芋仔甘藷新品系 TLSP-024 號春作之平均公頃鮮塊根及鮮莖葉產量分別為 19,000 及 6,000 公斤。景觀綠肥作物-亞麻適宜播種期為冬裡作，推薦亞麻每公頃播種量為 6 公斤。能源大豆採用機械播種及機械收穫約可降低生產成本 11%。食用甜玉米有機栽培之播種期以春作播種者較佳，無論春、秋作食用甜玉米之產量表現皆以每公頃施用 8,000 公斤粒狀有機質肥料為較佳。春作大豆有機栽培以 3 月 17 日播種者之表現較佳；食用玉米以糯性玉米之產量表現較佳；落花生以花蓮 2 號之產量表現較佳。東部保健作物之開發利用研究結果指出丹參在不同栽培環境下之丹參酸及丹參酮含量以吉安地區之表現較高；當歸及黃芩之產量表現亦以吉安地區為最佳。培養液添加保健作物萃取液可增進牛樟芝生長速率及提高牛樟芝醱酵產物的產量，同時試驗結果顯示牛樟芝醱酵液具有抑制黑色素形成之功能。

蔬菜：山苦瓜新品系 WB33 栽培密度試驗，最適栽培密度為 5 公尺×2 公尺。山苦瓜新品系 WB15 於 11 月 10 日取得植物品種權，品種名為‘花蓮 3 號’。山蘇新

品系 HA178 栽培密度試驗，以行株距 80x80 公分之生長表現最佳。番茄育種方面，抗捲葉病毒病大果型番茄新品系區域試驗，春作以 FMTT1176 品系平均產量及果實性狀表現較佳。青蔥耐熱品種選育，夏作以 HAF10484 品系之單叢重及蔥白長度等性狀表現較佳。夏季優質青蔥產銷體系之研究，設施栽培以蘭陽三號一福蔥生育較佳，模擬超市冷藏試驗以防霧袋小包裝之青蔥品質較佳。

花卉：百合品種改良以 FLME2-5 品系最佳。以不同香草植物萃取液進行百合切花採收後預措處理試驗，3 品種百合切花以不冷藏處理者瓶插壽命可達 5.0~9.1 天。建立茶樹精油及薰衣草精油萃取技術，與其他香草植物萃取液，調製皮膚保養產品；並派員前往加拿大農業部研究單位，研習有關香草植物種原利用，及其應用於保健加工方面事宜。萱草雜交後代中選出一個表現特殊之品系 OH005，開花最早，花期可長達 5 個月，具有多次開花的特性。運用球根花卉及香草植物於不同季節之開花特性，開發於休閒農業在景觀視覺上多樣化的利用，建立混植栽培模式。建立澳洲茶樹有機栽培模式，三年生澳洲茶樹之新鮮枝葉，每公斤精油產能為 16.6 毫升。白花野牡丹葉部槲皮酮含量高於紅花野牡丹，且類黃酮含量亦甚高，尤其是抗氧化能力甚強，具保健功能，值得開發。銀柳盆栽試驗，修剪有促進銀柳盆栽分枝之效果，修剪 5 次其分支數可達 35.1 枝。寒梅之種子發芽條件以介質包埋為宜，經過 12 週以上 5°C 低溫層積法處理，可顯著提升寒梅種子之發芽率。建立原生植物繁殖方法，輪葉紫金牛扦插成活率達 100%，臭茉莉之扦插成活率達 59.8%；輪葉紫金牛及臭茉莉二者經 3~4 個月即可達成盆階段。水生植物紫海棠 7-9 月頂芽扦插者不到 3 週即達成品，象耳則在 5-9 月種植生長最快，二種盆栽的成活率各月份均達 100%。紫海棠在不照光環境下能在水中維持 3 個月以上，建立株高控制方法，可使紫海棠株型緊密，提高水族缸用水草成品價值。

果樹：明尼桔柚試驗結果顯示套袋處理可明顯增加明尼桔柚果實重量，使用透明塑膠袋套袋，會降低果實可溶性固形物含量與酸度，使用單層白色紙袋套袋處理可增加果實外觀之紅色度。明尼桔柚減施氮肥增施鉀肥可明顯降低果實酸度，增進果實之糖酸比。文旦柚於果實發育期噴施腐黃酸處理，可明顯增加果實之糖酸比。利用 100°C 之石蠟液沾裹高接梨嫁接花苞，可提高花苞之著果與單株產量；花苞嫁接後利用遮雨小傘，可顯著增加著果數與單株產量。豐水梨採收後貯藏 1~2°C 低溫環境下，櫥架壽命可延長為 7 週。金柑健康芽系試作，單果重以

HF-1-12 號及 HF-1-8 號超過 19 公克最大。優質蓮霧種苗繁殖技術利用枝條頂梢綠枝插在 12 月上旬扦插成活率可達 92%，效果良好。

農產品加工：山胡椒為東部地區特有之植物，具有獨特的芳香風味且可刺激食慾，運用其特性成功開發消費者喜好且符合國家衛生標準之山胡椒香腸及臘肉，以作為地區特有之畜產品。

生物技術：將抗蟲基因 Cry1 IC 及 Cry1 AC 轉殖進入花蓮亞蔬五號番茄，共計有 6 個轉植株系均通過 PCR 及 RTPCR 檢定，確認抗蟲基因確定存在於番茄基因組中並且有表達，生物檢定結果顯示其中 4 個株系抗蟲能力較佳。菊花再生試驗，有四種培養基組合可增加菊花再生芽體。建立基改木瓜、水稻、番茄、大豆及馬鈴薯之聚合酶鏈鎖反應(PCR)檢測技術，本場檢測結果與盲樣相符，證實所開發的偵測技術為確實可行。台灣白及無菌播種試驗，以果莢成熟度 12 週之種子發芽率最高；培養基配方以低基鹽濃度且含有機添加物之處理，種子發芽率可達 70% 以上。綫草培植體於中濃度 BA 配合低濃度 NAA 組合處理誘導不定芽數 7 個為最多。國蘭根莖以液體培養方式，組合處理中以低濃度 NAA 與 BA 並添加椰子水可誘導 14 個芽體生成最高。

植物保護：本年度植物保護工作，就轄區農友栽培作物在生育期中所發生之病蟲害進行各項作物綜合防治及非農藥防治資材試驗研究、示範推廣及農藥安全使用監測追蹤等工作。梨赤星病經交替噴施藥劑結果於距離龍柏一公里左右感染率甚低。大波斯菊新病害以種子粉衣賽福座可濕性粉劑有效降低罹病率。茼蒿露菌病及蕹菜白銹病以亞磷酸的防治效果最好，以木黴菌處理種子可有效預防茼蒿及蕹菜立枯病。水稻稻熱病非農藥防治試驗以插單株秧苗處理發病最低。綜合應用淹水處理噴施菸草浸液、懸掛黃色黏紙誘殺及畦面周圍圍網防治黃條葉蚤使大白菜受害最低。利用蓖麻粕、蝦蟹殼粉、有機肥、珍珠石及泥炭土混合調製育苗介質添加拮抗菌對甘藍立枯病具抑病效果。銀葉粉蝨寄生菌對粉蝨成蟲及若蟲皆有良好的感染能力，對於卵孵化率無影響。瓜實蠅誘引劑之誘引效果會隨著風向、風速及距離而有差別，對誘殺雄蟲的效果具速效性。果實蠅密度以蓮霧栽培區的果實蠅密度為主要影響因子。花蓮新秀地區甘藷蟻象族群密度以 5-6 月和 10-11 月為主要發生高峰，性費洛蒙共同防治效果極佳。96 年度甜菜夜蛾田間週平均密度為 0.51 隻/誘蟲盒。經全年調查宜蘭五鄉鎮梨產區梨木蝨，均未偵測到梨木蝨存在。

野鼠及緬甸小鼠監測與防治結果為每公頃密度 20.9 及 4.6 隻。為把握水稻病蟲害適期防治及轄區經濟作物疫情監測，計發佈作物病蟲害發生預報 12 次、警報 5 次、新聞稿 28 次、氣象資訊及農作物防範措施 34 次。針對地區偵測結果本轄區無法定檢疫害蟲，並執行紅火蟻鑑定 6 件以上。執行作物病蟲害監測及防治處方服務，計診斷作物 50 餘種 249 件。輔導花蓮縣及宜蘭縣辦理作物安全用藥講習計 66 場次，96 年農藥殘留抽測合格率達 99.77%。

土壤肥料：養液栽培之栽培介質假堆稻殼的理化性質雖不比泥碳土好，但可利用少量及增加養液供給頻率的方式來克服，生產出高品質的蔬果。在透過源頭管理生產有機農業適用之禽畜糞堆肥試驗中，飼料中添加蛋白質及纖維酵素對雞隻之增重及飼料轉換率的促進效果優於添加重金屬者。利用稻殼乾餾液改善稻米品質試驗，結果顯示以稀釋 100 倍之乾餾液噴灑於水稻葉面對水稻之產量、米質及產量構成因素等皆無顯著影響。天然抑制雜草資材應用於有機栽培之研究結果顯示，掩埋處理對雜草生長的抑制效果較覆蓋處理佳，尤其是掩埋處理對闊葉雜草的抑制效果最佳。本年度作物營養診斷及土壤肥力分析總件數為 2,516 件，共服務農民 451 人次，作為農民施肥參考依據。

農業機械：附掛式綠肥播種機之開發，係針對綠肥作物種子設計之田間播種作業器，可疏解人工播種作業辛勞，提升播種作業時之均勻度。青蔥田間作畦打洞作業裝置之研製改良，成功開發作畦打洞功能機械，使達到一貫作業之目的。石蓮花簡易網室防颱設施，結構採用活動式組裝，拆裝容易，鋼架外周圍鋪設黑色遮陰網，夏季遇颱風豪雨來襲，可抗風暴、防積水、透氣及調節日照量；冬季可保溫及避免霜害，減少災害的一種簡易設施。活動式支柱關節開發設計，係將原固定式支架加以改良，其中支架下方設有上下組合之活動關節，當颱風來襲前讓作物支架平貼在地面上，對降低颱風災害具顯著效果。

農業推廣教育訓練：本年度農業推廣講習訓練活動共辦理 28 場次，共計 809 人參訓。落實推動農業漂鳥體驗，鼓勵青年留農築巢，辦理 8 梯次農業體驗漂鳥營隊，共 160 位學員參加，漂鳥築巢營 1 梯次，參訓學員計 24 人。辦理園丁計畫訓練 3 梯次，計 90 人。製作數位教材—有機栽培概論及有機液肥與堆肥製作技術各乙套。輔導宜蘭縣 10 個重點鄉鎮農會及花蓮縣 7 個重點鄉鎮農會，辦理四健推廣教育。

農業經營管理：推動農業產銷班組訓及輔導工作，共計整合花蓮及宜蘭縣農業產銷班 397 班。輔導羅山有機村組織人力與經營業務之推動，並配合「東部永續花東縱谷優質農業推動方案計畫」的工作項目，營造富里鄉三生一體的羅山有機村。為提升文旦產業競爭力持續推動文旦策略聯盟輔導工作，透過系列活動創造文旦之附加價值。輔導宜蘭縣與花蓮縣各級農會「推動農業經營企業化營造優質農業環境」計畫之研提、審查工作，輔導轄區責任輔導點三星地區農會訂定衛星廠與中心廠的品管流程及行銷策略，建立完整的供應鏈體系。輔導花蓮、宜蘭兩縣共 290 位農民取得產銷履歷驗證，面積達 387.53 公頃。

農村生活改善：辦理營造農村健康生活及生產支援體系計畫，輔導轄區宜蘭縣、花蓮縣各級農會共 227 班。另輔導花蓮縣、宜蘭縣之農村婦女開創副業—「田媽媽」班。推廣轄區當歸產業多樣性應用，舉辦「當歸養生保健創意料理競賽」並編印食譜。輔導農會系統研提及執行「整合鄉村社區組織計畫」，宜蘭縣共有 8 個社區，花蓮縣有 4 個。另於 8 月 31 日舉辦「2007 農村婦女發展論壇」，藉由論壇的討論及交流，提供農村婦女更新更廣的概念及未來發展之潛力。

農業資訊傳播：將試驗研究成果及產銷推廣活動訊息提供媒體刊登及播出，本年度辦理記者會 1 次，提送農委會新聞發佈之成果主題共 16 則，提送地方新聞媒體新聞稿 53 則，經媒體採納發佈共 125 次，電視行銷新聞主題 27 則。發行農業推廣雜誌共編印「花蓮區農業專訊」季刊 4 期、「花蓮區農情月刊」12 期及花蓮區農技報導 2 期。設立「花蓮區農業改良場全球資訊網 (www.hdais.gov.tw)」，本年度增加「政府資訊公開」專欄及無障礙網站(A+等級)之功能，擴大服務層面以共享農業資源，提昇農業資訊的 e 化應用。

為民服務：接待團體及人員 23 次，參訪人數計有 1,141 人。於 9 月 1 日辦理「農業科技研究成果展示與農特產品展售活動」，邀請一般社會大眾參與，總計有超過 5,000 人參加各項活動。

Summary

In 2007, 49 research projects, 21 demonstration plans and 21 commissioned projects from other organizations had been performed. The results were summarized as follow:

On rice: A promising rice breeding line HKY99 had been selected from advanced yield trial and will take part in the regional yield trail in 2008. The yields of all varieties in rice yield forecasting trial were less than last years. In the rice physiological index experiment for high quality product, the average accumulative temperature and accumulative radiation from transplanting to harvest were 1764.6°C-day and 1620.6 MJ/m² respectively in the first crop. To establish the local standard operating process, the results showed that the trial with 160g seeding rate, and 30cm×30cm of density in the first crop would get low-cost, optimum-yield and high-quality production. New rice varieties TY3, TY4, TNG74 and TNG75 were demonstrated in Hualien and Yilan Counties for promotion. To promote organic rice production, a total of 598 and 73 hectares were grown in Hualien and Yilan Counties, respectively. A total of 2,088 hectares of good quality rice were guided and established in seven rice producing districts.

On upland and special crops: Two peanut breeding lines Nan-Kai-Si 176 and Nung-Yu 56 in the spring crop and Nung-Yu 55 in the fall crop had performed high yield potential in the regional yield trails. In the improvement for cultural practice of taro-like sweet potato, the yields of fresh leaf-stem and root tuber of TLSP-024 were 19,000 and 6,000 kg/ha respectively in the spring crop. In the development of landscape green manure, the flax was suitable to sow in fall and winter seasons, and the seed sowing quantity was 6 kg/ha. In development and utilization of energy crop soybean, the results showed that the mechanical farming could reduce production cost by 11%. The fresh ear yield of organic sweet corn, applying 8,000 kg/ha of organic fertilizer, had performed higher yield potential. On the research of special crops in eastern area, roots of *Salvia miltiorrhiza* cultivated in Jian area had the highest active intergradient

tanshinones IIA. In comparison of the root weight of *Angelicacutiloba* and *Scutellaria baicalensis*, the highest yield was got from plants cultivated in Jian area. Adding the extraction solution from special crop into the medium could increase the growth rate and fermentation products of *Antrodia camphorate*. And the *Antrodia camphorate* fermentation product had the inhibitive effect on the melanin formation.

On vegetables: The new bitter gourd line WB15 was awarded a plant variety right and registered in November 10, 2007 as a new variety 'Hualien No. 3'. The optimum plant spacing was 5m x 2m for bitter gourd breeding line WB33, and 80cm x 80cm for nest fern breeding line HA178. For tomato breeding, the regional trial of tomato with resistance to tomato leaf curl virus had been conducted, and line FMTT1176 had the highest yield and better fruit quality than others. On green onion breeding, line HAF10484 had good performance with higher yield and long blanched stem in summer season. On the study of green onion production and marketing system in summer season, the variety 'Fu-tsun' grew best in green house, and green onion packaged with plastic-film bag could keep better quality under low temperature storage simulated in supermarket condition.

On flower crops: In lily breeding, the best line with superior performance is FLME2-5. On post-harvest trial with adding aromatic herbs extracts for three oriental lily varieties, the vase life was maintained between 5.0 to 9.1 days in room temperature. Some essential oils, extracted from aromatic herbs, had been chosen for cosmetic products. This year the Station had sent researchers to Agriculture and Agri-Food Canada Research Centers for visiting and learning. The major topics were aromatic herbs germplasm, health food processing techniques, and cosmetic products manufacture. One superior daylily hybrid progeny OH005 had been selected. OH005 is characterized with earlier flowering, longer flowering period, with multiple flower stems, and leaf rust tolerant. To diversify the visual landscape in leisure agriculture, one garden had been designed by mixing bulbous flowers and aromatic herbs together, and a year round flowering model had been established. In the study of tea tree, the model of organic culture for tea tree was established, three-year-old plants had the highest

production of shoots and essential oil, and the essential oil content was 16.6 ml per plant. For common *Melastoma* (white flower and red flower), the results showed that the leaf of common *Melastoma* contained much more rutin than quercetin, and the quercetin content in white flower was higher than red flower. The leaf of white flower possessed higher capacity to quench DPPH ($\alpha\alpha$ -diphenyl- β -picrylhydrazyl) than red flower. In pot culture of Cat-tail Willow experiment, pruning could increase branches, and pruning 5 times treatment had 35.1 branches. In flower-quince study, the seed germination percentage could be increased outstandingly with 5°C low-temperature stratification over 12 weeks in humid media. The survival rate of *Ardisia pusilla* and *Clerodendrum chinense* cuttings are 100% and 59.8% respectively. Both of them only took 3~4 months to achieve bonsai stage. Purple waffle plants' cuttings from shoot apexes cultivated in July to September grew apparently faster and became salable in 3 weeks. The plantlets of creeping burhead cultivated in May to September grew apparently faster. The survival rates of purple waffle plant and creeping burhead in every cultivated month were 100%. Purple waffle plant can endure the dark aquarium environment for more than 3 months without losing apparent performance. A plant height-control technique was developed, which could be used to control the purple waffle plants with compact and high quality appearance.

On fruit tree: Bagging treatment could increase the fruit weight of *Minneola tangelo* significantly. Bagging with plastic bag could decrease total soluble solid content and acidity, and bagging with single layer white paper bag could increase the red color of fruit appearance. The treatment of decreasing nitrogen and increasing potassium fertilizers could significantly decrease the acidity, and increase the sugar acid ratio of the fruit of *Minneola tangelo*. For Wentan pomelo, spraying with humic acid during the fruit development stage could increase the sugar/acid ratio of fruit. Dipping pear flower buds in 100°C melted-paraffin wax before top-grafting could improve the rate of fruit-setting and increase the yield. By attaching a miniature umbrella to each of the grafted buds, the rate of fruit-setting and yield were significantly increased. The storage life of Feng-shui pears could be extended to 7 weeks while storing at 1-2°C after harvest.

Within the healthy bud-lines of kumquats, HF-1-12 and HF-1-8 produced the largest single fruit that exceeds 19 grams. With respect to techniques of propagating high quality wax apple seedlings, the best result was found to cut the green shoot-tips at early December, and the survival rate reached a satisfactory 92%.

On processing of agricultural product: *Litsea cubeba* was a peculiar plant in the eastern Taiwan and had unique and fragrant flavor to stimulate appetite. Application of its specific character was used to process the sausage and cured meat as peculiar domestic meat products, which were liked by consumers and accord with the standard of national hygiene.

On biotechnology: Two genes Cry1 IC and Cry1 AC were transferred to tomato by *Agrobacterium* mediated method. The Cry1 IC gene proved to be expressed in 6 transgenic lines, which was confirmed by PCR and RTPCR assays. The bioassay results indicated that 4 tomato transgenic lines were more resistant to insects. Eight chrysanthemum cultivars were chosen for regenerating medium tests. There were 4 combinations of medium suitable for regenerating chrysanthemum. A PCR based technique was established for detecting genetic modified (GM) papaya, rice, tomato, soybean and potato. The GM and non-GM plants could be distinguished easily by this technique. The results of *in vitro* germination test for *Bletilla formosana* showed that 12 weeks after pollination could get the highest germination. The fittest medium was low salt-base strength with organic compounds. In *Spiranthes sinensis*, medium with middle concentration of BA and low concentration of NAA could induce 7 adventitious shoots, which was the highest in all treatments. For shoot formation of *Cymbidium* rhizome in liquid culture, the treatment of low concentration of BA, NAA and adding coconut milk could induce 14 adventitious shoots, which was higher than other treatments.

On plant protection: The integrated and non-chemical controlling, and safety using of chemicals in crops were conducted in this year. Low pear rust infection was observed when the distance between juniper and pear was longer than 1 km after alternately spraying chemicals. The severity of new disease in common cosmos could be decreased by applying seeds with triflumizole. The downy mildew of crowndaisy chrysanthemum

and white rust disease of water convolvulus could be controlled by foliar spraying with phosphoric acid. The damping-off disease of crowndaisy chrysanthemum and amaranth could be prevented by applying *Trichoderma* sp. on seed. In organic rice study, single tiller rice transplanting had the best control efficiency in rice leaf blast disease control. Integrated using tobacco leaf residue extract and plastic net could decrease the most damage of striped flea beetle on Chinese cabbage. The highest effect for controlling the damping-off disease of cabbage was found in which medium mixed with castor cake, shrimp crab shell powder, organic compost and perlite combined with antagonists. The pathogenicity of entomopathogenic fungus of *Bemisia argentifolii* was investigated, both adult and nymph mortality were high, but hatching rate of egg was not suppressed. Melon fly trapping was easily affected by the speed and direction of the winds, and related to the distance between melon fly and the attractant. The wax apple field was the main effective factor of density of oriental fruit fly. Evaluating co-control efficacy on sweet potato weevil showed sex pheromone got great control efficacy. The density of beet armyworm on green onion was 0.51/trap. The *Psylla* spp. was not detected in Ilan County pear orchards in 2007. The population of wild mouse and Brumese mouse were down to 20.9 and 4.6/ha respectively after baiting. In order to control rice pest at suitable time and monitor plant epidemic, the plant pest forecasts were issued 12 times, and the pest warning and prediction report, news release and meteorological information were issued 5, 28, and 34 times, respectively. There was no quarantine pest after surveying. More than 6 samples of suspected red imported fire ant were identified and control guidance was recommended. There were 249 cases of diagnosis and prescription conducted among 50 kinds of crops. There were 66 training courses held in Hualien and Yilan Counties for controlling crop pests and safety use of pesticides. The chemical residue qualified rate was 99.77% in 2007.

On soil and fertilizer: By comparing the cation absorbability and desirability, the pseudo-composted rice hull medium was not better than peat moss in nutrient solution culture. However, using auto-control machine to increase the fertilizer supply frequency could raise the efficiency of fertilizer and overcome the defects. In the study of

producing suitable compost by origin management for organic agriculture, the result showed that adding proteinase and cellulose enzyme into fodder was better than adding heavy metal for enhancing the chicken growth rate and the feed change ratio. On development of new material using charcoalization technology for rice culture, there were no significant differences on rice yield, quality and other factors by spreading the 100 times diluted rice hull vinegar over rice leaves. In the research of weed control by natural material in organic culture, the results showed that the effects for weed control by burying was better than mulching, especially for broad-leaved weed control. In 2007, 2,516 plant nutrition diagnosis and soil fertility analysis had been made, 451 farmers had been served.

On agricultural machine: A green manure seeding machine had been developed to alleviate the hard work of sowing, and improve the degree of sowing uniformity. A ridge making and holing machine for green onion had been developed, and it combined concurrently the holing, ridge making and fertilizer applying all at once. The anti-typhoon's facility with simple net had been designed to meet the growth of houseleek. This anti-typhoon's facility, which uses movable parts to fabricate, was easy to take apart and rebuild. The black shading nets were covered on outside of the rigid frame. In summer the nets could resist the storms, prevent flooding, allow ventilation, and adjust the sunlight. In winter the nets could keep warm and prevent frost attack. A fold joint pillar had been developed based on the original regular type pillar. The fold joint pillar included two parts. The upper part could be laid down before typhoon coming, which let plants attach the ground surface and could reduce typhoon damage.

On agricultural education and training: Twenty-eight courses of the agricultural extension education and training activities had been held in 2007 with 809 participants. To encourage the youth to undergo agricultural experience and input new agricultural manpower, 8 teams of the Wander-vogue camp had been carried out with 160 participants, and one team of the advance Wander-vogue camp with 24 participants. Three classes of Gardener Project had also been conducted with 90 participants. Two sets of digital teaching material of organic cultivation had been made. The 4-H clubs of

10 focus farmers' associations in I-lan and of 7 focus farmers' associations in Hualien were assisted to carry out extensional and educational activities.

On agriculture management: To promote organization training and guidance, 397 agricultural production and marketing teams had been integrated. To develop the Loshan organic village, counsel and training of organization and management had been provided to build Loshan organic village as a platform which integrated production, living and ecology aspects. To promote pomelo industry's competitiveness, the activities of the Pomelo Strategic Alliance had been pushed continuously. The pomelo flower season and the sales promotion activities had also been held to prolong the marketing period and to create the add-value of pomelo. Sanshin Farmers' Association, been appointed as a core organism in the program of Center-Satellite Network System, had been assisted to set up an industry value chain to enhance the quality of agricultural products, and to subscribe the quality control procedure and marketing strategy of both satellite and central plants. A total of 290 farmers with 387.53 ha in Hualien and Ilan counties had been assisted to acquire the certification of traceability of agricultural products.

On improvement of rural life: To conduct the project of the rural healthy life and the production supporting system, the farmers' associations had been assisted and guided, and 227 classes had been accomplished. Also, home economics improvement clubs had been counseled to create the rural employment opportunity, and increased the rural household income. To diversify the usage of Tang Kuei, a competition "Creative Cuisine of Tang Kuei" had been conducted. And a book "The Creative Healthy and Nutritious Ingredient Recipes of Tang Kuei" had been published. To construct a good environment of rural life, the farmers' associations had been guided and assisted to apply and execute the project of integrated rural community and organism, and there were 4 communities in Hualien and 8 communities in Ilan took part in this project. "The forum of development on rural women in 2007" were held at Aug. 31, 2007, with 178 participants came from industry, official, and different academic fields to share their

experience and knowledge, and to provide newer and broader vision and potential development in the future.

On agricultural information distribution: The information about the recent research achievements, and the production and marketing promotion activities were offered to the media for broadcasting. In this year, one press conference had been held in Council of Agriculture. In total there were 16 items of research achievement, 27 items of TV marketing news and 53 agriculture news had been released. The media had adopted and issued 125 times of the news. Agricultural extension magazines had been published including 4 issues of “Hualien District Agricultural Special Proceedings”, 12 issues of “Hualien District Agriculture Monthly” and 2 issues of “Hualien District Agricultural Technique Pamphlet”. To expand the service and promote the computerization application of agricultural information, “Hualien District Agricultural Research and Extension Station Worldwide Web (www.hdais.gov.tw)” had been set up, this year two new special columns “publication of government information” and “web accessibility service” had been set in.

On serve for the people: To strengthen the service for the habitants and farmers, a one-stop information counter service system had been set up. The Station had received 23 themes of visiting and 1,141 people this year. One “Open Day” activity had been held in 1st, Sep. to show the achievements to the public. There were 5,000 people attended this activity.