出國報告（出國類別：訓練）

赴亞蔬中心東南亞分部（泰國）參加「第 31 屆蔬菜訓練班－永續發展單元」

服務機關：行政院農業委員會

姓名職稱：湯惟真技正

派赴國家：泰國

出國期間：**101** 年 **11** 月 **4** 日至 **12** 月 **1** 日

報告日期：**102** 年 **2** 月 **22** 日

摘　　要

亞洲-世界蔬菜中心（亞蔬中心）在泰國舉辦蔬菜訓練班(International Vegetable Training Course, IVTC)迄今已第 31 屆，參與研習之學員多為各國從事研究、推廣、政策擬定或非政府組織人員。本訓練班課程分為 3 個單元：「從種子至採收」、「從採收到餐桌」與「永續發展」，每個單元各為期 1 個月，課程主要目標在於增進學員蔬菜生產栽培技術與經營管理技巧，以利學員回國後執行相關研發計畫或政策推動，以增進人民健康。

我國多年來首次派員參加，由本會台南區農業改良場趙秀涝助理研究員及高雄區農業改良場劉敏莉助理研究員於本(101)年 9 月份參加第 1 單元「從種子至採收」課程，研習種子(苗)管理、蔬菜育種及安全農業等技術；科技處湯惟真技正於 11 月份參加第 3 單元「永續發展」（本單元），研習永續發展概念、環境與自然資源，以及計畫撰寫、監控與評估等政策規劃之觀念與技巧。

湯技正自本年 6 月起統籌科技處之國際科技合作業務並負責亞蔬中心等國際組織相關科技合作事宜，參與本次研習除有助於參訓人員開拓國際視野，建立人脈，並精進語文能力，更有助於了解亞蔬中心業務之運作與推動，泰國當地產業發展情形，以及東南亞各國政策重點，以利後續國際科技合作業務之推動。

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赴亞蔬中心東南亞分部（泰國）

參加「第 31 屆蔬菜訓練班－永續發展單元」報告

壹、目的

本次參加亞洲-世界蔬菜中心（簡稱亞蔬中心）在泰國舉辦第 31 屆蔬菜訓練班(International Vegetable Training Course, 簡稱 IVTC)第 3 單元「永續發展」（簡稱本單元），目的係研習永續發展概念、環境與自然資源，以及計畫撰寫、監控與評估等政策規劃之觀念與技巧。除有助於參訓人員開拓國際視野，建立人脈，並精進語文能力，更有助於了解亞蔬中心業務之運作與推動，泰國當地產業發展情形，以及東南亞各國政策重點，以利後續國際科技合作業務之推動。

貳、基本資料

一、出國期間：101 年 11 月 4 日至 12 月 1 日

二、前往地區：泰國曼谷近郊 Kamphaeng Saen（距市區約 3 小時車程）

三、行程與課程概況

時　間	行 程	內　容
11 月 4 日（星期日）	啟 程	由台北出發至泰國曼谷近郊 Kasetsart 大學 Kamphaeng Saen 校區。
11 月 5 日至 11 日	第 1 週研習	主題「永續及發展」：研習有效領導、社群發展、合作、性別議題等基礎課程。
11 月 12 日至 18 日	第 2 週研習	主題「環境與自然資源」：自然資源保育以提高蔬菜生產之適應力，並規劃方法及衛生、GIS、都市與近郊園藝、災害準備、減輕與風險管理。

時　間	行 程	內　容
11 月 19 日至 25 日	第 3 週研習	主題「計畫撰寫、監控與評估」：指導學員進行計畫撰寫，並學習監控、評估與溝通。
11 月 26 日至 30 日	第 4 週研習	主題「發展行動計畫」：學員準備一份返回工作崗位將進行之行動計畫並報告。另於 11 月 27 日逕赴駐泰台北經濟文化辦事處拜訪秘書組。
12 月 1 日（星期六）	返 程	由泰國曼谷返回台北

參、訓練過程

本班同學共 16 位（清冊詳如附錄 1，圖 1），分別來自印尼（4 位）、孟加拉（3 位）、緬甸（2 位）、菲律賓（2 位）、印度、寮國、柬埔寨、越南及台灣（各 1 位），背景大多為研究人員，其中 6 位參與全期 3 個月課程。另與政策擬定相關者為印尼 2 位來自食品安全局，菲律賓 2 位來自教育部，其研習目的則均為推動學校菜園(School garden)。

本單元講師（課程詳如附錄 2）包括聯合國糧農組織(FAO)、東南亞人力農村社會領導研究院(SEARSOLIN)、亞洲婦女合作發展協會、亞洲備災中心及亞蔬中心等國際組織專家，以及 Kasetsart 大學相關科系教授。上課講義則由亞蔬中心於結業時，以光碟片提供相關檔案，供學員帶回利用。

課程進行方式除講授課程、問答之外，大部分講師設計分組討論及簡報（圖 2），以增加講師及學員之間互動，藉由充分討論過程學習如何跨越語言障礙，培養溝通與領導技巧；甚至到當地農村與農民互動並實地演練，以學習如何以淺顯易懂之方式與農民溝通，以了解農民生產所遇到之核心問題（圖 3）。另安排產業參訪，包括赴亞洲儲蓄聯盟互助協會(ACCU)了解該組織如何協助開發中國家之農村改善貧窮困境；赴地區農業推廣機構了解天敵飼養及組織培養情形（圖 4），

與農業推廣人員一同赴當地蔬菜生產之農村(Farmer Field School)了解其推動作物病蟲害綜合管理(Integrated Pest Management, IPM)之方式（圖 5），並且赴外銷黃秋葵 GAP 農場了解生產情形（圖 6）。另至曼谷市區參觀年輕世代自發性推動之家庭菜園(Home garden，圖 7)，以及地方政府推動之城市菜園(City garden，圖 8)。

課程結束前，則由各位學員運用課程指導之計畫撰寫、監控與評估原則，練習撰寫一份回國後可推動之業務規劃報告(Development Action Plan, DAP)，進行 20 分鐘簡報（學員報告題目詳如附錄 3），並由 Kasetsart 大學園藝系教授、亞蔬中心指導師等專家提問並提供建議。本人因刻正推動農業科技研發績效制度之建立相關業務，故以”Improving the Performance Management of Agricultural Research & Development Projects in Taiwan”為題，運用本次受訓所學習之計畫規劃、撰寫、監控與評估等觀念，提出規劃報告及簡報（詳如附錄 4 及 5）。本份業務規劃報告撰寫之邏輯及內容於當場受專家講評之肯定，並提醒績效指標達成度之估算方式難度確實頗高，例如：新品種推廣後，農民或消費者所獲得之間接效益，需要長時間累積相關數據，且應另案辦理相關訪談研究，以訂定計算及證實方式，泰國目前亦缺乏相關機制。

另於赴泰期間，拜訪駐泰台北經濟文化辦事處協助處理農業事務之秘書組藍夏禮組長及連周慶秘書，大略向該處介紹農業科技目前發展動向，以及未來成立財團法人農業科技研究院，主要推動動物疫苗、飼料添加劑及生物製劑，並交換相關意見。

肆、心得與建議

一、課程研習方面

1. 本單元內容與農業整體發展相關，非僅聚焦於蔬菜產業，且課程設計以個人志向、人道關懷、改善貧窮及增進營養攝取為出發點，確實可擴大學員接觸及思考之面向。另課程討論方面，常需分享各國現況，故有助宣傳台灣目前政策，並了解其他東南亞國家相關之發展，尋求合作機會。建議未來可持續

推薦本會農糧署、輔導處、企劃處、國際處同仁參與本單元課程。

2. 講師與學員互動良好，且藉由設計分組討論，可藉機了解學員所屬國家之問題與現況，故建議未來應推薦國內學者或本會專家擔任 IVTC 之講師，以利流通相關資訊，加強培養國內農業人員之國際化視野，並宣傳台灣於該等專業領域之產出與貢獻，尋求合作機會。
3. 上課方式因有許多分組討論及報告之機會，所以對於學員練習英文表達，以及如何跨越語言障礙培養溝通與領導之技巧相當有助益。
4. 泰國之農業推廣單位刻正於各農村以 Farmer Field School 由農民實作施行之方式，推動蔬菜之 IPM 栽培，並指導如何以調配天然肥料。由農民分享心得可知，打從心裡接受這是對環境及健康友善之生產方式，很樂意接受這樣的成長與轉變，未來也會持續使用。另參訪農業推廣單位之病蟲害管理中心，生產大量天敵如草蛉、寄生蜂及木黴菌（菌液購買自國外商業生產公司），並生產健康種苗無償提供農民使用，且該等推廣單位向非洲購買黃蜂(Anagyrus lopezi)以防治介殼蟲。而符合 Thai-GAP/Global GAP 規範生產黃秋葵外銷之農場，其生產方式均需依循包裝場之規定，農民使用之農藥、肥料均由包裝場提供，且不可有藥劑殘留。故由上可知，生物製劑應有很大市場潛力，如需推展該等資材市場，應由包裝場或其上游之出口商著手接洽。
5. 曼谷市區年輕世代自發性推動家庭菜園(Home garden)，其服務之精神及理念令人感動，且頗有成效。原本這群青年所秉持之理念是由節能減碳之角度出發，形成社團後引入相關非政府組織之資源，提供推廣、教育、顧問等協助。而這樣的理念，經過去年曼谷水災之後，使市區民眾深刻體認而紛紛加入參與，於自家庭園種植蔬菜且以有機方式種植。另地方政府（相當於區公所層級）推動之城市菜園(City garden)，則由政府雇員管理，就近供應該地區市場，亦為去年水災所帶來之危機意識所採行之措施。
6. 與同學之互動可知，印度政府推動不使用化學肥料，為該國未來農業生產趨勢，故我國之生物製劑如可推展該國市場，應有很大潛力。印尼政府大力推

動「One Day No Rice」之政策，故倡導多食用蔬菜以增進營養及飲食多樣化，以舒緩其人口成長所帶來之糧食安全危機，故本年派遣政府部門 9 位學員參與 IVTC 第 1 單元課程，4 位同學參與第 3 單元課程，以利返國後大力推動 School garden 及增加學童家庭蔬菜消費量等相關措施。另緬甸人口密度每平方公里僅 89 人，土地廣闊且未開發，該國農業部欲極力發展種子種苗產業，目前已與一家中國公司合資成立公司並進行水稻育種。而菲律賓政府為推動中小學之 School garden，則是派遣教育部及地方教育人員參訓，可看出該國政府擬深化農業於基礎教育，而農業部門與教育部門有良好之合作互動。

二、亞蔬中心業務方面

1. 本會刻正強化我方農業試驗研究機構與亞蔬中心蔬菜科技合作研發，並擬規劃台灣業者及農試機關育成品種（系）及農業資材海外調適性研究。惟赴亞蔬中心東南亞分部期間，發現該分部人力及土地確實有限，且重點放在校園、家庭、醫院菜園之推廣業務。故如需進行品種及資材海外調適性研究，可能需藉由亞蔬中心與 Kasetsart 大學之關係，找當地教授合作試驗可能較為妥適。
2. 由本單元課程之參與，可以體會亞蔬中心任務重點由以往之技術及品種改進，轉型往成果之推廣發展，並且有一套經濟評估模式，例如一個新品種釋出農民使用後，對於農民生產成本、收入及生活改善等進行訪談及經濟分析。本會科技研發目前仍較著重於技術研究端，成果產出推廣或技轉後，少有相關效益評估之研究，且缺乏量化工具與基準，故研發或推廣績效不易呈現。另由於近年科技研發經費緊縮，個人建議部分研究應退場或暫緩，而著重將研究人力及資源投入於推廣發展。

三、拜訪駐泰國台北經濟文化辦事處意見交換部分

1. 泰國農業進步很快，以往我方以技術輸出方式輔導該國，但現在泰國農業已經很發達，且許多國際組織設在該國，國際關係及資源豐富，建議本會應考量利益互惠而長期布局農業合作項目。另認為與泰國進行農業科技合作可以

是未來重點，惟不宜操之過急，應多花些時間擬定策略及布局，且可多與該處互動，讓該處了解本會相關策略並提供建議，願意擔任平台盡力協助。另建議本會如有請該處協助之事宜，請及早告知，除緊急案件，請盡量避免臨時通知該處辦理。

2. 有關農業資訊之蒐集，較具專業者應為農技團，惟農技團目前只有派駐清邁且人力有限，恐無法照應。據該處了解，國合會自明年起擬派駐一名專家輔導泰國亞洲理工大學(AIT)一果蠅相關計畫之進行，該處判斷其工作量應可再負荷其他項目，故建議本會如有相關業務，可洽國合會了解協助。
3. 該處相當關注亞蔬中心東南亞分部之動態並積極參與其辦理之相關國際活動。另肯定亞蔬中心之國際關係，其辦理之國際研討會均可邀請到全體東協國家出席。另東協國家與中國大陸關係密切，政治敏感度高，故如本會擬請亞蔬中心在台辦理國際研討會，大部分國家可能考量政治因素而不派員出席，影響實質效益。該處並分享在政治氛圍下，外交不宜敲鑼打鼓，應以達到實際目的考量之觀念。另有關 IVCT 訓練班，該處亦贊同選送國內學者或本會專家擔任課程講師。
4. 該處於本年 10 月份針對泰國華僑辦理緬甸投資說明會，認為現在適逢美國極力促使緬甸開放外人投資，且緬甸才剛通過外人投資法，我方如對緬甸農業方面之投資有興趣，現在正是時機。惟緬甸與中國大陸關係更加密切，故更應小心低調。

四、研習之議題或可導入產業相關科技研發部分

1. 全世界糧食每年損失/浪費量超過 13 億公噸，其中蔬菜水果損失/浪費量占產量之 45%，就永續發展之觀點而言，現階段減少損失/浪費之議題較產量提升為迫切，我國目前此情況亦趨嚴重。

(1)科技研發部分，宜強化採後處理、加工利用及廢棄物處理相關研發，惟檢視本會所屬試驗研究機關此等專長領域之研發人力較為不足，故可採補助/委託方式由大專院校或財團法人辦理。

(2)如何減少糧食浪費部分，非屬科技研發議題，提議由產業單位與教育及餐飲業主管機關合作宣導，避免耗費許多資源進行生產卻遭浪費。

2. 蔬菜品種研發部分，目前育種方向大多為抗耐逆境如耐淹水、耐熱等，惟作物對於抗耐逆境之適應性有一定限度，故依據世界糧農組織強化永續生產、處理技術、農民教育、改善健康及營養攝取等發展目標，下一階段可針對特定作物中特定營養成分含量較高之品種進行選拔及推廣，以及成分萃取等產品研製。
3. 有關氣候變遷議題，目前科技研發之思維為強化因應氣候變遷之調適能力，故研發方向多著重於如何因應。惟資源有限，建議亦可評估哪些項目是調適無效而不需要投入太多資源發展之項目。
4. 碳足跡標示(Carbon Footprint Label)為未來國際貿易趨勢（泰國目前已將碳足跡認驗證導入罐頭出口加工業），針對我國重要外銷農產品品項，允宜適時投入碳足跡計算標準之相關研究。

圖 1.「第 31 屆蔬菜訓練班－永續發展單元」各國參訓學員結業典禮後與亞蔬中心東南亞分部同仁全體合影。

圖 2. 上課方式因有許多分組討論及報告之機會，所以對於學員練習英文表達，以及如何跨越語言障礙培養溝通與領導之技巧相當有助益。

圖 3. 赴當地農村透過翻譯與農民互動，以實地演練如何以淺顯易懂之方式與農民溝通，以了解農民生產所遇到之核心問題。

圖 4. 參訪 Suphanburi 農業推廣單位之病蟲害管理中心，該中心生產大量天敵如寄生蜂(A)、草蛉(B)及木黴菌(C)，並生產健康種苗(D)無償提供農民使用之情形。

圖 5. 赴當地蔬菜生產之農村(Farmer Field School)了解其推動作物病蟲害綜合管理(Integrated Pest Management, IPM)及分析成效之方式。

圖 6. 赴外銷黃秋葵 GAP 農場了解生產情形。現場解說外銷規格，另觀察到田間病害情形嚴重。

圖 7. 曼谷市區參觀年輕世代自發性推動之家庭菜園(Home garden)，圖為向學員介紹家庭菜園理念推動情形、參觀家庭菜園、堆肥製造與蚯蚓養殖情形。

圖 8. 曼谷市區參觀地方政府推動之城市菜園(City garden)，圖為堆肥製作情形，以及菜園種植情形。

附錄 1、「第 31 屆蔬菜訓練班第 3 單元永續發展」參訓學員清冊

31st International Vegetable Training Course

Module 3: Vegetables for Sustainable Development

	Name	Country	Designation and Organization
	Mohammad Mazharul Karim	Bangladesh	Scientific Officer Bangladesh Agricultural Research Institute
	Md. Rabiul Islam	Bangladesh	Scientific Officer Bangladesh Agricultural Research Institute
	Taslima Jahan	Bangladesh	Scientific Officer Bangladesh Agricultural Research Institute
	An Vannak	Cambodia	Researcher Kbal Koh Vegetable Research Station, Department of Horticulture and Subsidiary Crop
	Tilak Gajmer	India	Deputy Director Department of Horticulture and Crops Development Government of Sikkim
	Yusuf Dawam	Indonesia	Head, Horticultural Cultivation Division Regional Agriculture Office, Kediri East Java
	Putu Bagus Daroini	Indonesia	Research and Dissemination Staff Assessment Institute for Agricultural Technology, East Java
	Akber Maulad	Indonesia	Staff, Food Safety Division Center of Dietary Diversification and Food Safety Food Security Agency, Ministry of Agriculture

	Name	Country	Designation and Organization
	Haris Akhmad	Indonesia	Staff, Food Safety Division Center of Dietary Diversification and Food Safety Food Security Agency, Ministry of Agriculture
	Phathana Seng Ourkeo	Lao PDR	Researcher Horticulture Research Center Haddokkeo Village Hadchaypong District, Vientiane
	U Thein Neng	Myanmar	Assistant Director Department of Industrial Crops Development
	Tin Tin Wai	Myanmar	Assistant Officer Department of Agriculture Ministry of Agriculture and Irrigation Nay Pyi Taw
	Juan Araojo, Jr.	Philippines	Officer in Charge Health and Nutrition Center Department of Education
	Angeline Calatan	Philippines	Medical Officer/ Coordinator National Greening Program (NGP) Division of Benguet, Cordillera Autonomous Region (CAR) Department of Education
	Wei-chen Tang	Taiwan	Specialist Department of Science and Technology Council of Agriculture, Executive Yuan
	Khuyen Thi Bui	Vietnam	Researcher Fruits and Vegetables Research Institute

附錄 2、「第 31 屆蔬菜訓練班第 3 單元永續發展」課程內容

Day/Date	Time	Activity/Topic	Resource Person /In-Charge
Sunday, 4 November		Arrival of participants (Bangkok to Kamphaengsaen, Nakhon Pathom)	Ms. Pishayapa Thongmalai Office Assistant AVRDC – The World Vegetable Center
Monday, 5 November	09.00 – 10.00	Welcome Remarks Introduction of AVRDC staff Course Overview Expectations Setting Administrative Orientation *Venue: AVRDC Training Room*	Dr. Robert J. Holmer Regional Director AVRDC – The World Vegetable Center Ms. Sheila de Lima Administrative and Training Officer AVRDC – The World Vegetable Center
	10.30 – 12.00	Introduction to Development Action Plans (DAP)	Ms. Sheila de Lima
	13.30 – 16.30	MDG and Sustainable Development Issues	Ms. Normindelger Bayasgalanbat Technical Officer for Nutrition Policies and Programmes Food and Agriculture Organization of the United Nations 39 Phra Atit Road, Bangkok 10200, Thailand
6 November, Tuesday	08.30 – 12.00	Participation to Farmer Field School	Mr. Suttipong Jangthong Department of Agriculture and Extension, Thailand
	13.30 – 16.30	Leadership and Development	Dr. Anselmo B. Mercado Southeast Asia Rural Social Leadership Institute Philippines
7 November, Wednesday	08.30 – 11.00	Community Development Approaches and Cooperative Innovations	Dr. Anselmo B. Mercado
	11.00 – 12.00	Lunch Break Travel to Bangkok	
	14.00 – 17.00	Visit and Interaction with ACCU and FORDEC Venue: Association of Asian	Ms. Leni San Roque Manager, Member Services Association of Asian Confederation of Credit Unions

Day/Date	Time	Activity/Topic	Resource Person /In-Charge
		Confederation of Credit Unions (ACCU) *8th Floor, U Tower Building, No.411, Srinakarin Rd.,Suanluang,Bangkok 10250, Thailand* Travel back to Kamphaeng Saen	Dr. Amporn Wathanavong Director Foundation for Rehabilitation & Development of Children and Family (FORDEC)
8 November, Thursday	08.30 – 12.00	Community Development Approaches and Cooperative Innovations	Dr. Anselmo Mercado
	13.30 – 16.30	Community Development Approaches and Cooperative Innovations	Dr. Anselmo Mercado
9 November, Friday	08.30 – 12.00	Development Communications	Ms. Maureen Mecozzi Head, Communication and Information AVRDC – The World Vegetable Center
	13.30 – 16.30	Development Communications	Ms. Maureen Mecozzi
10 November, Saturday		Free Time	
11 November, Sunday		Free Time	
12 November. Monday	08.30 – 12.00	Gender and Development	Ms. Kruewan Chonlanai Asian Women in Co-operative Development Forum Thailand
	13.30 – 16.30	Gender and Development	Ms. Kruewan Chonlanai
13 November, Tuesday	08.30 – 12.00	Participation to Farmer Field School	Mr. Suttipong Jangthong Extensionist, Suphanburi Pest Management Center, Department of Agriculture and Extension, Thailand
	13.30 – 16.30	Field trip to Community Vegetable Garden practicing Good Agricultural Pratices(GAP), Kamphaeng Saen, Nakon Pathom, Thailand	
14 November, Wednesday	08.30 – 12.00	Farmer Based approaches to integrated farming system: success stories of Thailand farmers(lecture and field trip at Pest Management Center)	Mr. Suttipong Jangthong Extensionist, Suphanburi Pest Management Center, Department of Agriculture and

Day/Date	Time	Activity/Topic	Resource Person /In-Charge
		Venue: Suphanburi Pest Management Center, Department of Agriculture and Extension, Suphanburi Province, Thailand	Extension, Thailand
	13.30 – 16.30	Field visit to Bueng Chawak organic vegetable farm Suphanburi Province, Thailand Travel back to Kamphaeng Saen	Ms. Pishayapa Thongmalai Office Assistant AVRDC-The World Vegetable Center
15 November, Thursday	08.30 – 12.00	Geographic Information Systems	Dr. Foyfah Chutidhamrong Department of Soil Science Kasetsart University, Kamphaeng Saen Campus
	13.30 – 16.30	Remote Sensing for Agriculture	Dr. Foyfah Chutidhamrong
16 November, Friday	08.30 – 12.00	Disaster Preparedness	Mr. Atiq Kainan Ahmed Climate Information Application Specialist of Climate Change and Climate Risk Management Asian Disaster Preparedness Center (ADPC) Bangkok, Thailand
	13.30 – 16.30	Disaster Preparedness	Mr. Atiq Kainan Ahmed
17 November, Saturday		Visit to Bangpain palace, floaiting market in Ayuttaya	Ms. Pishayapa Thongmalai
18 November, Sunday		Free Day	
19 November. Monday	08.30 – 12.00	Project Proposal Writing	Dr. Pepijn Schreinemachers Agricultural Economist AVRDC – The World Vegetable Center
	13.30 – 16.30	Project Proposal Writing	Dr. Pepijn Schreinemachers
20 November, Tuesday	08.30 – 12.00	Project Proposal Writing	Dr. Pepijn Schreinemachers
	13.30 – 16.00	Project Proposal Writing	Dr. Pepijn Schreinemachers
	16.00 – 21.00	Community Exercise on participatory approaches	Dr. Pepijn Schreinemachers
21 November, Wednesday	08.30 – 12.00	Project Monitoring and Evaluation	Dr. Pepijn Schreinemachers

Day/Date	Time	Activity/Topic	Resource Person /In-Charge
	13.30 – 16.30	Project Monitoring and Evaluation	Dr. Pepijn Schreinemachers
22 November, Thursday	08.30 – 12.00	Biotechnology's contribution to Food and Nutritional Security	Assist. Prof. Dr. Sermsiri Chanprame Professor Department of Horticulture Kasetsart University Kamphaeng Saen, Tahiland
	13.30 – 16.30	Biotechnology's contribution to Food and Nutritional Security	Assist. Prof. Dr. Sermsiri Chanprame Kamphaeng Saen Campus
23 November, Friday	08.30 – 12.00	Climate Change, Agriculture and Food Security	Dr. Ed Sarobol Vice Dean, Faculty of Agriculture, Kasetsart University, Bangkhen Campus
	13.30 – 16.30	Climate Change, Agriculture and Food Security	Dr. Ed Sarobol
24 November, Saturday		Free Day	
25 November, Sunday		Free Day	
26 November, Monday	08.30 – 12.00	Field trip to school and community garden	
	13.30 – 16.30	Field trip to school and community garden	
27 November, Tuesday	08.30 – 16.00	Preparation of DAP	Participants
28 November, Wednesday	08.30 – 16.00	Preparation of DAP	Participants
29 November, Thursday	08.30 – 16.00	DAP Presentation	Participants
30 November, Friday	08.30 -10.30	Evaluation Workshop	Sheila de Lima
	11.00 -12.00	Closing Program Awarding of Certificates	
	12.00	Farewell Lunch	
1 December, Saturday		Departure	

附錄 3、「第 31 屆蔬菜訓練班第 3 單元永續發展」參訓學員業務規劃報告題目

	Name	Country	Development Action Plan
	Mohammad Mazharul Karim	Bangladesh	Year-round homestead vegetable production in Khagrachari Hill District, Bangladesh
	Md. Rabiul Islam	Bangladesh	Development of high yielding heat tolerant tomato in Manikganj, Bangladesh
	Taslima Jahan	Bangladesh	Technology development for production of seedless teasle gourd (*Momordica dioica*) in Bangladesh
	An Vannak	Cambodia	Off-season tomato grafting on-farm trial in Kingdom of Cambodia
	Tilak Gajmer	India	Assessment and evaluation of carbon sequestration under different organic production systems in Sikkim, India
	Yusuf Dawam	Indonesia	Improved chili production in Kepung District, Kediri Region, East Java, Indonesia
	Putu Bagus Daroini	Indonesia	Sustainable food in home garden system for food security development in Puhjarak Village, Kediri Region, East Java Indonesia
	Akber Maulad	Indonesia	School garden prototype development to increase vegetable consumption in Indonesia

	Name	Country	Development Action Plan
	Haris Akhmad	Indonesia	School garden prototype development with food safety education in Indonesia
	Phathana Seng Ounkeo	Lao PDR	Lao traditional *Capsicum* sp. germplasm collection and conservation
	U Thein Neng	Myanmar	Integrated farming systems for Nay Pyi Taw council area, Myanmar
	Tin Tin Wai	Myanmar	Promoting Integrated Pest Management technologies to farmers in Nay Pyi Taw council area, Myanmar
	Juan Araojo, Jr.	Philippines	Sustaining vegetable gardens in public elementary and secondary schools in the Philippines
	Angeline Calatan	Philippines	Sustainable school vegetable feeding program among public school grade 1 to grade 3 pupils in Benguet, Philippines: A bridge to good health and nutrition
	Wei-chen Tang	Taiwan	Improving the performance evaluation of agricultural research and development projects in Taiwan
	Khuyen Thi Bui	Vietnam	Monitoring of pesticide residue in fresh vegetables in North Vietnam

附錄 4、本次受訓撰寫之業務規劃報告

Development Action Planning

Improving the Performance Management of Agricultural Research & Development Projects in Taiwan

Tang, Wei-chen
Specialist, Department of Science and Technology, Council of Agriculture, Executive Yuan (COA), Taiwan R.O.C

Part 1: Development Setting

1.1 Analysis and Insights

1.1.1 National Situation

Taiwan with area of 36,000 km^2 extends 394 km from north to south and 144 km from east to west. It located in latitude from 21°53' to 25°18' N, in longitude from 120°01' to 121°59' E. The climate divides into 2 climates, the subtropical monsoon climate in the north and tropical monsoon climate in the south. Besides, the population of Taiwan is approximately 23 million and 260 thousands, and the population density of 639 persons/km^2 is one of the highest in the world (ARI, 2012).

Multifaceted terrain with mountains and rugged hills cover two-thirds of Taiwan island caused the complex and diverse ecology and only about 8,300km^2 (23%) of land are suitable for agriculture. In Taiwan, the average farm covers 1.1 ha (0.11km^2), so that the agricultural sector is largely composed of small family farms. In addition, Taiwan located in the subtropics and tropics with plentiful sunlight and abundant rainfall, and the high

temperature and moisture suitable for pathogen to propagate.

According above limitations, Taiwan needs to work to develop agriculture by introducing advanced technologies and modern equipments (COA, 2009).

1.1.2 Introduction of Council of Agriculture

Council of Agriculture (COA) is the highest administrative authority for agriculture in Taiwan, and it has 14 internal units and 23 subordinate agencies, all of which work together to regulate matters relating to the nation's agriculture, forestry, fisheries, animal husbandry, and food grain (COA, 2012).

Department of Science and Technology is one of the internal units of COA, and administers the policies making, budgets distributing and projects managing for agricultural science and technology R&D[1]. Facing the challenge of climate change, the COA has also been integrating and strengthening the technologies for monitoring, assessment, and adaptation to assist agribusinesses in upgrading their capacity to cope with adverse conditions (COA, 2011), and puts emphasis on 3 levels:

(1) Policy level

Formulating and supervising the policies and regulations by technology foresight, international trend, and demands of industry.

(2) Innovative R&D level:

[1] Department of Science and Technology focus on the development of the innovative technology industry. The farmers counseling and communities etc. are belong to Department Farmer Service.

Coordinating and supervising agricultural research institutes for innovative R&D, and conducting the 10 research teams for major agricultural industries for advancing the development of the industries.

(3) Industrialization level

Devoting to establish a well management system for intellectual property, and promote the commercialization and industrialization of agricultural technology. These efforts have helped expedite the application of R&D outputs for industries incubation and agribusiness assistance. Besides, promoting the construction of agricultural science parks, and prepare for the establishment of a institute responsible for agricultural science and technology industrialization.

The total budget of agricultural science and technology R&D is about USD$120 million per year, which is 4% of total budget in COA. The research fields including agriculture[2] (19% of R&D budget), biotechnology (19%), epidemic prevention and detection (15%), agricultural policy and technology management (11%) *etc*. (Fig.1). The resources are so limited, but the research field is so diverse, and the number of agricultural R&D projects is more than 2,000 per year, so the performance management is big challenge and the R&D performances to be more economical, efficient, and effective.

[2] The research field of the item 'agriculture' is depended on the crops, including vegetable crops (USD $5.5 million, 24% of the agriculture R&D budget), fruit crops (17%), floriculture (13%), rice (13%) and other crops (33%).

1.2 Target group

The research system for COA can separate to 2 fields (Fig.2): one group doing academic research and the other doing applied research. For the academic research, the outputs usually license to agribusinesses and farmer's associations by the way of technology transfer; for the applied research outputs are free to extend to production/marketing groups and farmers by the way of technology extension. The agricultural research institutes involved in this research system including:

(1) COA invests the 35% of total R&D budget to Academia Sinica, universities, and the other research foundations. The number of researchers to execute the projects is more than 400.

(2) COA's 16 subordinate agencies use the other 65% of total R&D budget. These agencies can divide to 2 groups:

A. 7 research institutes: there are about 845 researchers.

B. 9 extension stations: there are about 530 researchers.

Closer to 1,800 researches involve in the COA's research system and execute more than 2,000 projects with USD$120 million budget. These researchers are the target group in this action plan.

1.3 Core Problem Analysis

1.3.1 Core problem : contribution of Agricultural R&D has not yet been highlighted.

1.3.2 Causes

(1) Researchers lack the concepts about strategy management.

(2) Common indexes in Taiwan are not suitable for Agriculture.

(3) Lake the performance evaluation tools and completed system.

(4) Many R&D performances of Agriculture are difficult to be quantified and measured.

1.3.3 Effects

(1) Researchers' performances can't be measured objectively, so that it is difficult to be rewarded and encouraged.

(2) If indexes are not representative, it would lead the wrong objective and result of R&D.

(3) Publics don't understand how important the contribution of Agriculture is.

(4) Resources (ex: R&D budget) competition between different divisions of central government.

Part 2: Plan of Action

2.1 Vision-Mission Statement

2.1.1 Vision

To enhance the vitality and competitiveness of the agricultural research institutes, and then upgrade the agricultural R&D performances to be more economical, efficient, effective, furthermore to increase the contribution of society.

2.1.2 Mission of the Development Action Plan

To establish a goal-oriented performance management

mechanism and ensure that the administrative resources be used effectively.

2.2 Objective Statement

This action plan is set up for the future 3 years (2013-2015). In 2010-2012, Department of Science and Technology has conducted a team to define suitable evaluative indicators (6 dimensions and total 40 indicators) and for evaluating the performance of agricultural research institutes. In the concepts, the performance of institute level should be bottomed up by project management level, so the goal of the next-3-year is to modify and pilot these evaluative indicators to the project management level. The objectives of this active plan are:

(1) In 2013: operating the agricultural performance indicators from the stages of proposal submission, examination, project execution, monitoring and evaluation, then introduce to the target group (researchers) and to implement.

(2) In 2014: analyzing the results last year, and according to the projects' characters to define the key performance indicators (KPI) then set up the standard assessment methods of every KPI.

(3) In 2015: reviewing the performance, and building up the encouragement and R&D budget distribution mechanisms.

2.3 Formulation of Strategies and Plan of Activities

2.3.1 Components, activities and resources required

(1) Modify and pilot the evaluative indicators to the project management level

Activities	Time	Budget (USD$)	Manpower (human*month)
A. Survey and analysis the appropriate indicators and clarify the stakeholders of each indicator	Jan-Jun (2013)	3,000	12
B. Modify the existed project management on-line system to pilot the indicators to every stage of project management	Jul-Sep (2013)	30,000	12
C. Edit the guideline manuals	Jun-Sep (2013)	2,000	8
D. Hold at least 4 conferences for introducing to the target group (researchers) and giving the concepts about strategy management	Oct-Nov (2013)	2,000	4
E. Apply the performance evaluating system for the next-year proposal submission	Nov-Dec (2013)	-	-

Total	1 year	37,000	36

(2) Define the key performance indicators (KPI) then set up the standard assessment methods

Activities	Time	Budget (USD$)	Manpower (human*month)
A. Analysis the predetermined indicators and target outputs in last year of every integrated project, and find out the KPI for each characteristic project	Jan-Jun (2014)	3,000	12
B. Collect the feedback from target group (researchers), and find out then set up the standard assessment methods of each KPI	Jul-Nov (2014)	30,000	18
C. Re-edit the guideline manuals	Dec (2014)	1,000	4
Total	1 year	34,000	34

(3) Build up the encouragement and R&D budget distribution mechanisms

Activities	Time	Budget (USD$)	Manpower (human*month)

A. Target group (researchers) need to evaluate their output, outcome and impact of the their projects in 2014	Jan-Jun (2015)	-	-
B. Analysis the above information and rank the performance for trying to build up the encouragement and R&D budget distribution mechanisms	Jul-Nov (2015)	30,000	18
C. Put forward the suggestion of the mechanisms	Dec (2015)	2,000	4
Total	1 year	32,000	22

2.3.2 Other Descriptions of the Action Plan

The duties of Department of Science and Technology are including that to coordinate and supervise the agricultural research institutes for innovative R&D, so there is an existing network and well linkage. Besides, the agricultural R&D budgets are also management by the Department of Science and Technology, so this unit can decide the distribution of various resources.

In addition, the performance management and even the strategic management are the new concepts in agriculture, and in the past, the contribution of agricultural R&D was not easy to be highlighted, so that effects the resources competition between COA

and the other divisions of central government. Nowadays, COA needs a R&D performance management, so it is an important policy of current programs.

Furthermore, the action plan is follow the past-3-years work of define suitable evaluative indicators. In the past 3 years (2010-2012), Department of Science and Technology came to the 16 subordinate research institutes to communicate about these indicators for the performance of institute level and got the researchers' participation and feedback. In these 3 years (2013-2015) of this action plan, the target group is expanded to not only 16 subordinate research institutes but also all the agricultural research institutes and more than 2,000 projects, so the difficulty will be more challengeable but the process should be more smooth and the action plan would be more contributive to develop a more economical, efficient and effective environment for agricultural R&D.

In the past 3 years (2010-2012), I was the organizer of the work to define suitable evaluative indicators, and now is also the organizer of the action plan in 2013-2015. There are a research team (4-5 researchers) and the project management on-line system and database vector will involve to execute this action plan under the Department of Science and Technology's conduct. My responsibilities are planning the action plan's objectives, make sure the items of activities and the resources, monitoring all the process of the plan, and communicating with the target group to

coordinate. Besides, my section chief supervises the performance of this plan, and director and vice director of Department of Science and Technology guide the policy directions, and responsible the impacts.

2.4 Evaluation and Monitoring System

This action plan is one of the agricultural R&D project, so needs to follow the regulations about evaluation and monitoring system of COA. The plan's proposal needs to be examined, especially the resource inputs' reasonability. Then, the plan executive team needs to submit the paper reports every 3 months. Every half year there is a committee meeting to evaluate the outputs and outcomes.

References

1. ARI (Agricultural Research Institute). 2012. The development of the seed industry in Taiwan (unpublished).
2. COA (Council of Agriculture). 2009. Agriculture: Republic of China (Video)
3. COA (Council of Agriculture). 2011. Yearly report of 2010.
4. COA (Council of Agriculture). 2012. About COA, (http://eng.coa.gov.tw/list.php?catid=8798).

Appendices

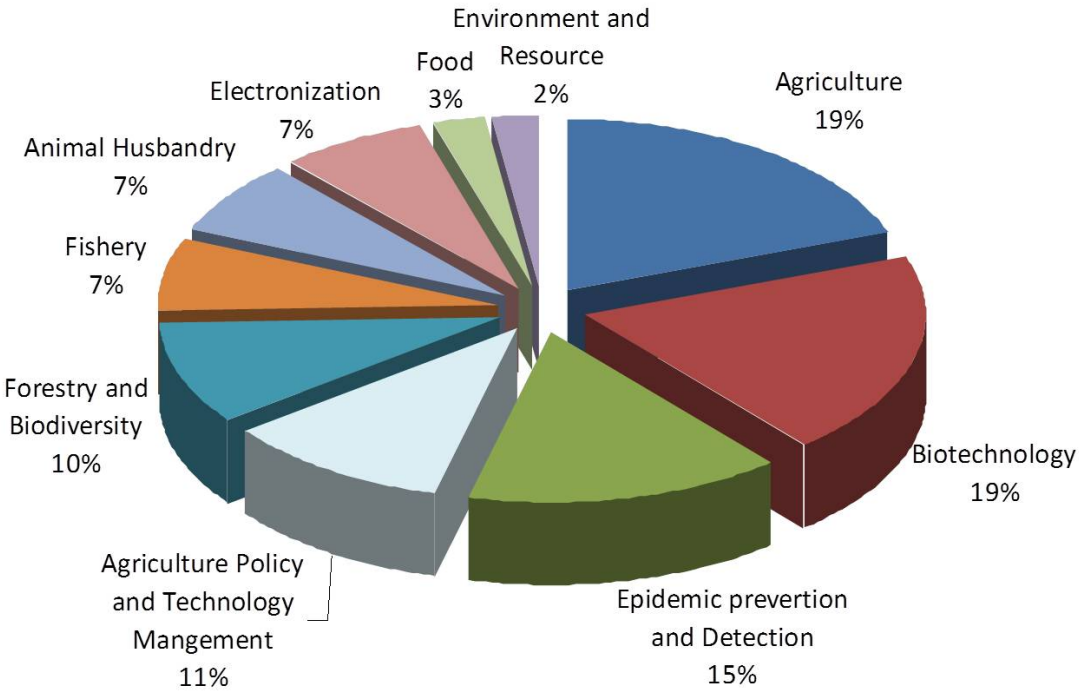


Fig.1 The budget COA invested in research fields of agricultural science and technology. (The internal data in 2011 statistics from agricultural project management system, unpublished)

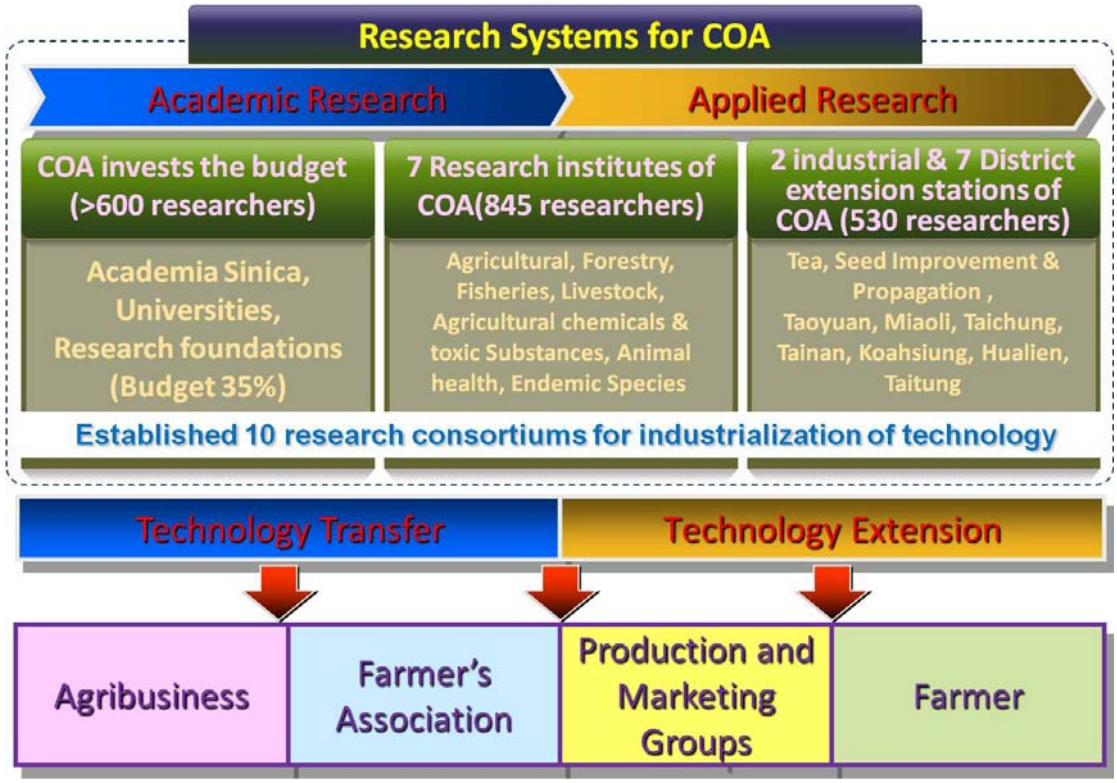
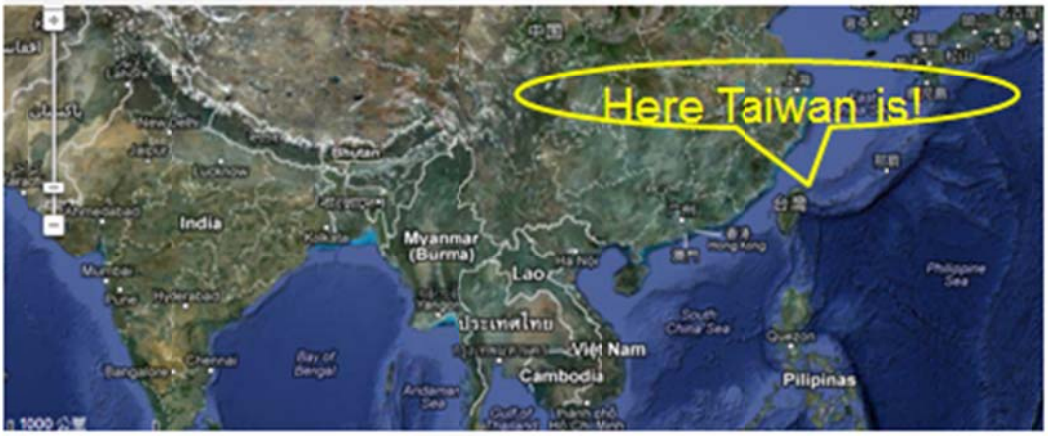


Fig.2 The research systems for COA.

附錄 5、本次受訓撰寫之業務規劃簡報

1.1.1 National Situation

- **Area: 36,000km²**
  - N→S: 394km
  - E→W: 144km
- **Location**
  - Lat: 21°53' - 25°18' N
  - Long: 120°01' - 121°59' E
- **Climate**
  - North: subtropical monsoon
  - South: tropical monsoon
- **Population**
  - 23 millions



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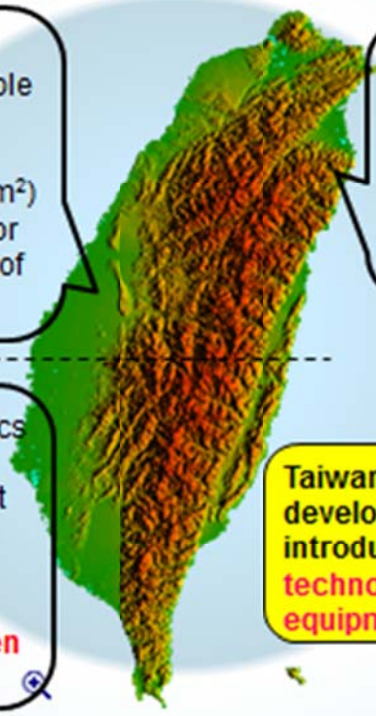
1.1.1 National Situation (cont.)

- **Environment for Agricultural Production in Taiwan**

Only about 8,300km² (23%) of land are suitable for agriculture
→The average farm covers **1.1 ha** (0.11km²)
→The agricultural sector is largely composed of **small family farms**

Multifaceted terrain with mountains and rugged hills cover two-thirds of the island
→**Complex and diverse ecology**



Located in the subtropics and tropics
→With plentiful sunlight and abundant rainfall
→High temp and moisture
→**Suitable for pathogen to propagate**

Taiwan needs to work to develop agriculture by introducing advanced technologies and modern equipments

4

1.1.2 Introduction of COA

- Council of Agriculture (COA)
  - Highest administrative authority for agriculture in Taiwan
    - 14 internal units
      - Including the Department of Science and Technology
    - 23 subordinate agencies

Authority for:
-Agriculture
-Forestry
-Fisheries
-Animal husbandry

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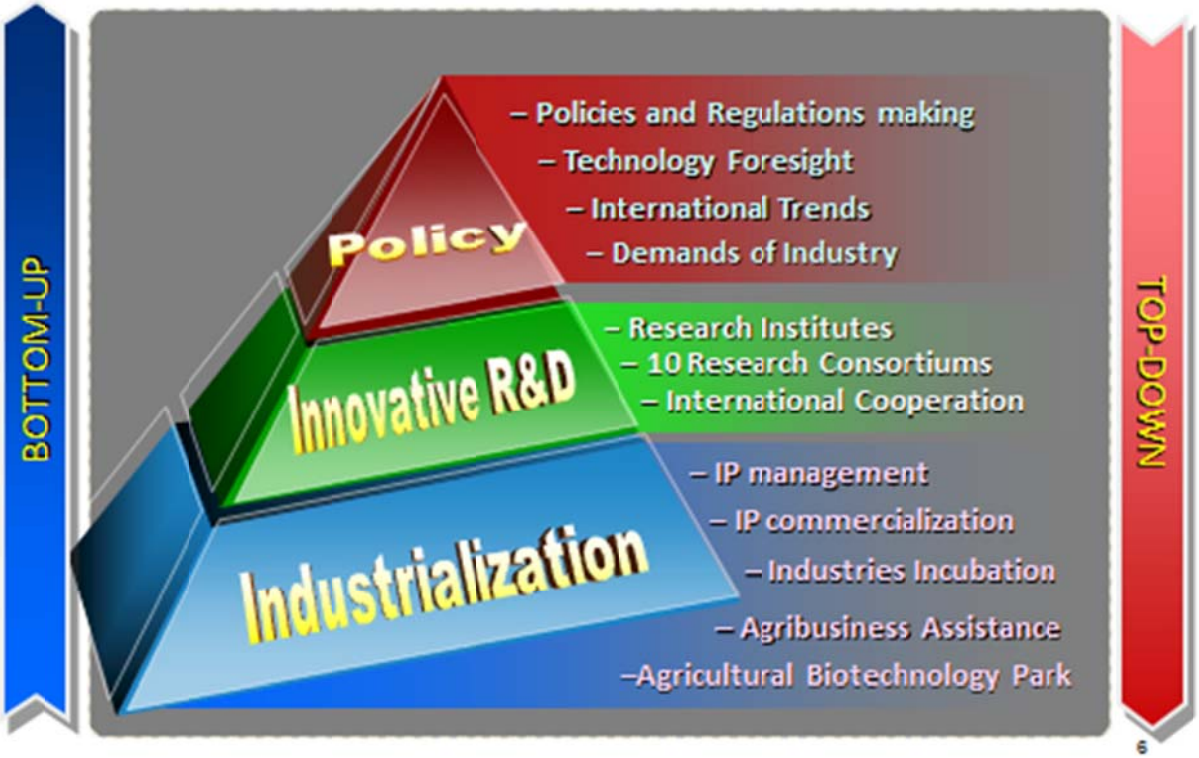
1.1.2 Introduction of COA (cont.)

- Duties of the Department of Science and Technology (DST) for COA



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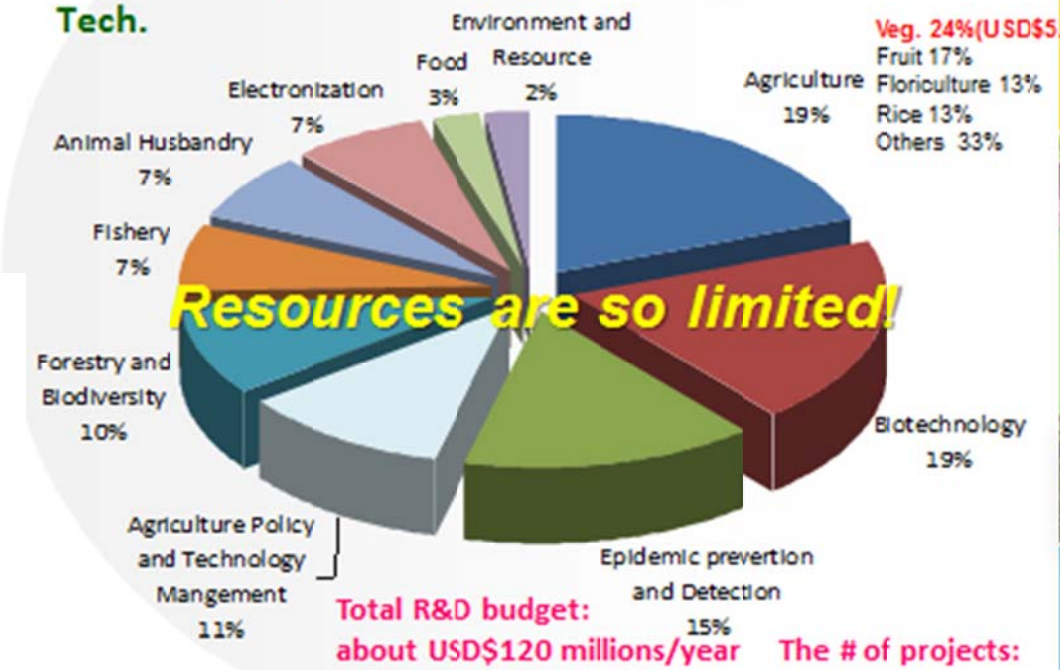
1.1.2 Introduction of COA (cont.)

❖ **Invested Budget in Research Fields of Agricultural Sci. & Tech.**



Veg. 24%(USD$5.5millons)
Fruit 17%
Floriculture 13%
Rice 13%
Others 33%

Total R&D budget: about USD$120 millions/year (4% of total budget in COA)

The # of projects: >2,000/year

1.2 Target Group

Research Systems for COA

Academic Research		Applied Research
COA invests the budget (>400 researchers)	7 Research institutes of COA(845 researchers)	2 industrial & 7 District extension stations of COA (530 researchers)
Academia Sinica, Universities, Research foundations (Budget 35%)	Agricultural, Forestry, Fisheries, Livestock, Agricultural chemicals & toxic Substances, Animal health, Endemic Species	Tea, Seed Improvement & Propagation, Taoyuan, Miaoli, Taichung, Tainan, Koahsiung, Hualien, Taitung

Established 10 research consortiums for industrialization of technology

Technology Transfer | Technology Extension

Agribusiness | Farmer's Association | Production and Marketing Groups | Farmer

1.3 Core Problem Analysis

❖ **Problem Tree**

Effects:

1. Researchers' performances can't be measured objectively, so that it is difficult to be rewarded and encouraged
2. If indexes are not representative, it would lead the wrong objective and result of R&D
3. Publics don't understand how important the contribution of Agriculture is
4. Resources (ex: R&D budget) competition between different divisions of central government

Core problem: Contribution of Agricultural R&D has not yet been highlighted

Causes:

1. Researchers lack the concepts about strategy management
2. Common indexes in Taiwan are not suitable for Agri.
3. Lake the performance evaluation tools and completed system
4. Many R&D performances of Agri. are difficult to be quantified and measured

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Part 2 : Plan of Action

2.1 Vision/Mission
2.2 Objectives
2.3 Strategies/Activities
2.4 Evaluation/Monitoring

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2.1 Vision/Mission

Vision:

Increase the contribution of society

Upgrade the agricultural R&D performances to be more economical, efficient, effective

Enhance the vitality and competitiveness of the agricultural research institutes

Mission

Establish a goal-oriented performance management mechanism

Ensure the effective use of administrative resources

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2.2 Objectives

2013

1. Operating the agricultural performance indicators from the stages of proposal submission, examination, project execution, monitoring and evaluation
2. Introduce to the target group (researchers) and to implement

2014

1. Analyzing the results last year, and according to the projects' characters to define the key performance indicators (KPI)
2. Set up the standard assessment methods of every KPI

2015

Reviewing the performance, and building up the (1)encouragement and (2)R&D budget distribution mechanisms

Follow up the Works in 2010-2012

1. Suitable evaluative indicators (6 dimensions and total 40 indicators) has been defined for evaluating the performance of agricultural research institutes.
2. In the concepts, the performance of institute level should be bottomed up by project management level, so the goal of the next-3-year is to modify and pilot these evaluative indicators to the project management level

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2.3 Strategies/Activities

❖ **Components, Activities and Resources Required**

(1) Modify and pilot the evaluative indicators to the project management level

Activities	Time	Budget (USD$)	Manpower (human*month)
A. Survey and analysis the appropriate indicators and clarify the stakeholders of each indicator	Jan-Jun (2013)	3,000	12
B. Modify the existed project management on-line system to pilot the indicators to every stage of project management	Jul-Sep (2013)	30,000	12
C. Edit the guideline manuals	Jun-Sep (2013)	2,000	8
D. Hold at least 4 conferences for introducing to the target group (researchers) and giving the concepts about strategy management	Oct-Nov (2013)	2,000	4
E. Apply the performance evaluating system for the next-year proposal submission	Nov-Dec (2013)	-	-
Total	1 year	37,000	36

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2.3 Strategies/Activities(cont.)

(2) Define the key performance indicators (KPI) then set up the standard assessment methods

Activities	Time	Budget (USD$)	Manpower (human*month)
A. Analysis the predetermined indicators and target outputs in last year of every integrated project, and find out the KPI for each characteristic project	Jan-Jun (2014)	3,000	12
B. Collect the feedback from target group (researchers), and find out then set up the standard assessment methods of each KPI	Jul-Nov (2014)	30,000	18
C. Re-edit the guideline manuals	Dec (2014)	1,000	4
Total	1 year	34,000	34

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2.3 Strategies/Activities(cont.)

(3) Build up the encouragement and R&D budget distribution mechanisms

Activities	Time	Budget (USD$)	Manpower (human*month)
A. Target group (researchers) need to evaluate their output, outcome and impact of the their projects in 2014	Jan-Jun (2015)	-	-
B. Analysis the above information and rank the performance for trying to build up the encouragement and R&D budget distribution mechanisms	Jul-Nov (2015)	30,000	18
C. Put forward the suggestion of the mechanisms	Dec (2015)	2,000	4
Total	1 year	32,000	22

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2.3 Strategies/Activities(cont.)

- **Other Descriptions**
  - **Well linkage, networking and resources access**
    - DST coordinate and supervise the agricultural research institutes for innovative R&D
    - DST can decide the distribution of various resources
  - **Important current policy**
    - Nowadays, COA needs a R&D performance management
      - It directly effects the resources competition between COA and the other divisions of central government

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2.3 Strategies/Activities(cont.)

- **Contribute to the integrated development**
  - **In the past 3 years (2010-2012)**
    - R&D performance indicators of institute level
    - DST has communicated with the 16 subordinate research institutes
    - Got the researchers' participation and feedback
  - **In these 3 years (2013-2015)**
    - The **target group is expanded** to not only 16 subordinate research institutes but also all the agricultural research institutes and more than 2,000 projects
      - » The difficulty will be more challengeable
      - » The action plan would be more contributive to develop a **more economical, efficient and effective environment** for agricultural R&D.

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2.3 Strategies/Activities(cont.)

- **Management structure and responsibilities**

Director/Vice Director

Guide the policy directions, and responsible the impacts

Section Chief

Supervises the performance of this plan

Me

(1)planning the action plan's objectives, (2)make sure the items of activities and the resources, (3)monitoring all the process of the plan, and (4)communicating with the target group to coordinate

(1)Research team (4-5 researchers) and (2)Project management on-line system and database vector

Execute this action plan

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2.3 Evaluation/Monitoring

❖ **Follow the regulations of COA's R&D project management**

Proposal
- Examined
- Input's reasonability

Project Executed
- Submit brief paper reports every 3 months

Committee meeting
- Every half year to evaluate the outputs and outcomes

After finishing the project, the project management system will monitor the outputs and outcomes every year for 4 times

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Thank you
Welcome to visit Taiwan~

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