出國報告（出國類別：研習）

出席亞洲生產力組織(APO)舉辦之「加強市場進入之農產品品質標準培訓師訓練(Training of Trainers on Quality Standards for Agricultural Products to Enhance Market Access)」報告

服務機關：行政院農業委員會農糧署
姓名職稱：李雅蓁　專員
派赴國家/地區：寮國/永珍
出國期間：107 年 12 月 10 日至 12 月 14 日
報告日期：108 年 3 月

目　次

摘　要

亞洲生產力組織(APO)於 107 年 12 月 10 日至 12 月 14 日在寮國永珍舉辦「Training of Trainers on Quality Standards for Agricultural Products to Enhance Market Access」訓練課程，與會人員包含新加坡、韓國及日本講者各 1 名，以及孟加拉、柬埔寨、斐濟、印度、印尼、伊朗、寮國、馬來西亞、蒙古、尼泊爾、巴基斯坦、菲律賓、斯里蘭卡、泰國、越南及我國參與者共 20 名。藉由此次研討會議，瞭解目前品質標準規範之國際趨勢、農產品生產現代品質標準(GAP、有機農業)以及發展有效益及有效率的產銷價值鏈，在生產、採收、包裝、運輸及銷售流程中建立管控點。主辦單位並安排參訪當地種植洋香瓜、番茄並已取得寮國良好農業規範(Laos GAP)認證之農場，亦藉由分組討論及各國參與者經驗分享，彼此交流對於品質控管之措施及執行方式，期與會者能依據整體發展方向及原則，建立適用於各國之品質管理制度，共同提升農業產銷供應鏈。

壹、背景與目標

在任何種領域的供應鏈裡，品質標準已成為往來貿易的共通語言，尤其對農產品而言，國際間通用或各國自行訂定之品質標準，對於確保農產品安全及提升商品價值非常重要。品質標準的規範除了技術性層面，亦包含私人通路的規定，規範也會因品項及外銷目標國家而異，但規範的目的，皆是為了確保產品品質、環境保護及消費者健康，藉由適當的品質控管，可提升農民收益及消費者信心。

品質標準的規範，包括國際間通用的 GLOBALG.A.P.，區域間通用的 ASEAN GAP、EURO GAP，或各地區的 JGAP, ThaiGAP, MyGAP, IndoGAP, TGAP, IndiaGAP, VietGAP, PhilGAP 等，以及各國對有機農產品的規範。臺灣的品質控管制度已發展多年，目前有臺灣農產生產追溯(QR code)、吉園圃、產銷履歷(TAP)、臺灣優良農產品(CAS)及有機農產品標章，各標章皆有其目的及對象。藉由此次 APO 舉辦之訓練課程，瞭解目前品質標準規範的國際趨勢，亦藉由各國參與者經驗分享，彼此交流對於品質控管之措施及實際執行方式，期能共同提升農業產銷供應鏈體質。

貳、訓練課程基本資料及議程

一、訓練課程名稱：Training of Trainers on Quality Standards for Agricultural Products to Enhance Market Access

二、日期：107年12月10日至12月14日

三、地點:寮國永珍

四、本國參加人員：行政院農業委員會農糧署企劃組李雅蓁專員

五、其他與會人員：新加坡、韓國及日本講者各1名，其他包括孟加拉、柬埔寨、斐濟、印度、印尼、伊朗、寮國、馬來西亞、蒙古、尼泊爾、巴基斯坦、菲律賓、斯里蘭卡、泰國及越南參與者共19名。

六、訓練課程流程：

Time	Activity	Responsible organization / Speaker
Day 1. Monday, 10 December 2018		
09:00–09:30	*Registration*	Local organizers
Opening Session		
09:30–10:00	**Opening Session** - Welcome and opening address by LNPO - Introduction of participants and resource persons - Group photo	
10:00–10:30	*Coffee break*	
10:30–11:00	Pre-course written test	Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
	Module 1 International Trends in Quality Standards of Agricultural Products	
11:00–12:00	**Presentation 1:** Why quality standards? -Introduction, concepts, principles and features of quality standards, role of quality standards in market access-	Ms. Ryoko Matsuda Office Manager The Consumer Goods Forum, Japan
12:00–12:30	Discussion	
12:30–13:30	*Lunch break*	
13:30–14:30	**Presentation 2:** Global trends in quality standards -Increasing demands for certified products-	Ms. Ryoko Matsuda
14:30–15:00	Discussion	
15:00–15:15	*Coffee break*	
15:15–16:15	**Presentation 3:** Quality standards desired by retailers	Dr. Rodney Wee

Time	Activity	Responsible organization / Speaker
	-Requirement from major retailers such as supermarket and convenience store chains-	Chief Executive / Principal Consultant, Asia Cold Chain Centre, Singapore
16:15–16:45	Discussion	
Day 2. Tuesday, 11 December 2018		
08:45	Attendance	Local Organizers
09:00–09:15	Recap of Day 1 Activities	Participants
	Module 2: Modern Quality Standards of Agricultural Production	
09:15–10:45	**Presentation 1**: Food safety standards of agricultural products -Chemical residue, quarantine, etc. – (Short break in the middle of the presentation 15 mins)	Mr. Isidor Byeong Deok Yu Managing Director, Isidor Sustainability Research Institute, Rep. of Korea
10:45–11:30	Discussion	
11:30–13:00	Lunch break	
13:00–14:15	**Presentation 2:** GAP standards	Mr. Isidor Byeong Deok Yu
14:15–14:45	Discussion	
14:45–15:00	Coffee break	
15:00–16:15	**Presentation 3:** Organic standards and labeling rule	Mr. Isidor Byeong Deok Yu
16:15–16:45	Discussion	
Day 3. Wednesday, 12 December 2018		
08:45	Attendance	Local organizer
09:00–09:15	Recap of Day 2 activities	Participants
	Module 3: Development of effective and efficient Food Value Chains for better agri-food quality and safety	
09:15-10:15	**Presentation 1:** Storage and distribution standards -Washing, pre-cooling, sorting, packing, etc.-	Dr. Rodney Wee
10:15–10:45	Discussion	
10:45–11:00	Coffee break	
11:00–12:00	**Presentation 2:** Innovative logistics of agricultural products -Use of apps, robotics in automated distribution centers,	Dr. Rodney Wee

Time	Activity	Responsible organization / Speaker
	autonomous transport, etc.-	
12:00–12:30	Discussion	
12:30-13:30	Lunch break	
13:30-15:00	**Module 4: Sharing of country case study by participants** (APO Resource Persons to comments)	Participants, Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
15:00-15:30	Coffee break	
15:30–17:00	Module 4 (continues)	Participants, Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
Day 4. Thursday, 13 December 2018		
08:00–08:0	Assemble at hotel lobby (Departure for site visit)	Local organizer
08:30–12:30	**Module 5: Field/company visit** (a farm or market to observe implementation of quality standards of agricultural products)	Local organizer
12:30–13:30	Lunch break	
13:30–14:30	**Module 3 - Presentation 3:** Innovative labelling and packaging technologies for promoting export of agri-food products	Dr. Rodney Wee
14:30–15:00	Discussion	
15:00–15:15	Coffee break	
15:15–16:15	**Presentation 4**: Temperature Management along the Food Cold Chain	Dr. Rodney Wee
16:15–16:45	Discussion	
18:30-21:00	Dinner host by Lao NPO/DOSMEP	Rose Boutique Hotel
Day 5. Friday, 14 December 2018		
08:30–08:45	Attendance	Local organizers
08:45–09:00	Recap of Day 3 & 4 activities	Participants
	Module: 6 Group Exercise:	Participants
09:00–10:30	Identify challenges and opportunities in implementation of quality standards and formulate strategic action plan needed to resolve them (APO resource persons to assist)	Participants, Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu

Time	Activity	Responsible organization / Speaker
10:30–11:15	Presentation of discussion output by each group in a plenary session (APO Resource persons to comment)	Participants, Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
11:15–11:30	Coffee break	
11:30–12:30	Final examination	Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
12:30–12:45	Explanation of answers of the examination	Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
12:45–13:45	Lunch	
13:45–15:15	**Follow-up actions and Program evaluation:** - Formulation of follow-up action plans to be undertaken by individual participants - Program evaluation by participants, resource persons, and implementing organization	Local organizers, Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
15:15–16:15	**Closing & certification** - Remarks of resource persons - Vote of thanks by a participant - Closing remarks - Certificate conferment	Local organizers, Ms. Ryoko Matsuda, Dr. Rodney Wee, Mr. Isidor Byeong Deok Yu
Saturday, 15 December 2018		
Departure of participants from Vientiane		

參、 訓練課程內容摘要

一、 講師: Ms. Ryoko Matsuda, Office Manager, The Consumer Goods Forum, Japan.
Dr. Rodney Wee, CEO, Asia Cold Chain Centre, Singapore.
Mr. Isidor Byeong Deok Yu, Managing Director, Isidor Sustainability Research Institute, Rep. of Korea.

二、 課程主題及內容:

(一)主題:農產品品質標準的國際趨勢

相較於品質、通路、價格等因素，食品安全為一「非競爭性」因素，而是所有食品供應鏈參與者皆應遵守之基本要求。有鑑於食品安全為全球需共同努力維護的目標，The Consumer Goods Forum為一跨國組織，成員橫跨70多個國家400多位成員，包含零售通路、加工業者、服務提供者及國際組織等，該組織的願景希望提供各國消費者安全的食品，並提出許多重要倡議，包括消費端的價值鏈(產業間合作以提供消費者更好的服務)、健康與福利(強化全球消費者健康)、食品安全、非食品的安全(提升產銷價值鏈的透明度，建立消費者信心)、環境永續、社會永續(建立合理的工作環境)、永續供應鏈(建立可信賴的全球性永續標準)。

全球食品安全倡議(The Global Food Safety Initiative，GFSI)由The Consumer Goods Forum管理運作，調和及提升各種食品安全標準規範，期能促進同等性及減少貿易障礙，GFSI檢視各公私部門的品質標準文件，建立從生產到銷售各階段盤點清單，亦協助公私部門提升食品安全建構能力，也與各國公部門合作，藉由共同參與及對話機制調和各國規範。受GFSI認可的驗證體系包含GLOBALG.A.P.、CANADAGAP、ASIAGAP、FSSC22000、SQF、IFS等，GFSI可減少稽核及其他成本，提升永續性、消費者信心、營運效率及貿易機會。

規範的訂定不僅是由制定規範的組織決定，各產業具規模及影響力的業者亦有決定權利，在食品供應鏈中，規範的制定不只能影響產品的狀態及貯架壽命，在銷售端也會影響消費者的購買行為。

(二)主題：農產品生產的現代品質標準

食品安全意指使食品免於危害，而這些危害可能對食用者的健康造成影響，危害包括微生物(細菌、病毒、原生動物、寄生蟲)、化學 (農藥、食品添加物、過敏原、自然毒素)及物質 (玻璃碎片、金屬碎片)等。食品安全應從田間開始管控，在食品供應鏈裡每個角色都對其具有責任，因此各階段皆需訂定適當之作業規範。

良好農業規範(Good Agricultural Practice，GAP)提供一個普遍性框架，作為作物種植和產品加工遵循的基本標準，GAP的應用並非為了額外提升品質，而是產銷鏈的基本要求。GAP以永續的方式利用自然資源，以人道的方法生產安全、健康的食品/非食品，規範的範圍包含土壤、水源、作物生

產、作物保護、動物健康及福利、收穫及場內加工與儲存、能源與廢棄物管理、員工健康福祉、野生動物、景觀等等。各階段需注意的重點如下:

1. 田間衛生:廢棄物處置、鄰田汙染、落果處理、來訪者或作業人員。
2. 人員衛生:乾淨的手、無生病的徵兆、無傷口、受過相關訓練、現場張貼指示、員工健康檢查報告。
3. 採收:設備、工具、人員衣物、容器衛生、容器不落地、如廁前脫掉衣物及採收工具等。
4. 採後處理:可參考應用SSOP & HACCP,乾淨的空間和運輸設備、使用可飲用的水、乾淨的衣物及工具、使用的化學藥劑須經認可、無動物接近、食品等級的油及潤滑劑、冷鏈及預冷設備運用。
5. 廁所:根據員工數量設立鄰近廁所、設置地點沒有對作物有直接汙染風險物質、保持清潔,洗手設備需具有乾淨的水、清潔肥皂及擦手紙等。
6. 水源供應:無汙染物質、風險分析、大腸桿菌每季檢驗。
7. 植物保護物質的應用:使用者須受過專業訓練、使用量及濃度、安全採收期、紀錄保存、根據風險分析作殘留量檢測。
8. 糞肥的應用和堆積:清楚的來源資訊、加熱或堆肥處理、使用後與種植時間和收穫時間的間距、乾淨的機械等。
9. 動物的限制:監測動物的出現、隔離措施。
10. 生物安全:陌生人警戒、受聘僱員工的背景、進入限制、訪客進入的安全程序、化學物質需上鎖。
11. 制度:有許多已訂定的公私部門制度可運用,例如HACCP、SSOP、GMP、GAP。

有機農業是一種較不污染環境、不破壞生態,並能提供消費者健康與安全農產品的生產方式,遵守自然資源循環永續利用原則,不允許使用合成化學物質,強調水土資源保育與生態平衡,並達到生產安全農產品的目標。有機農業各階段需注意的重點如下

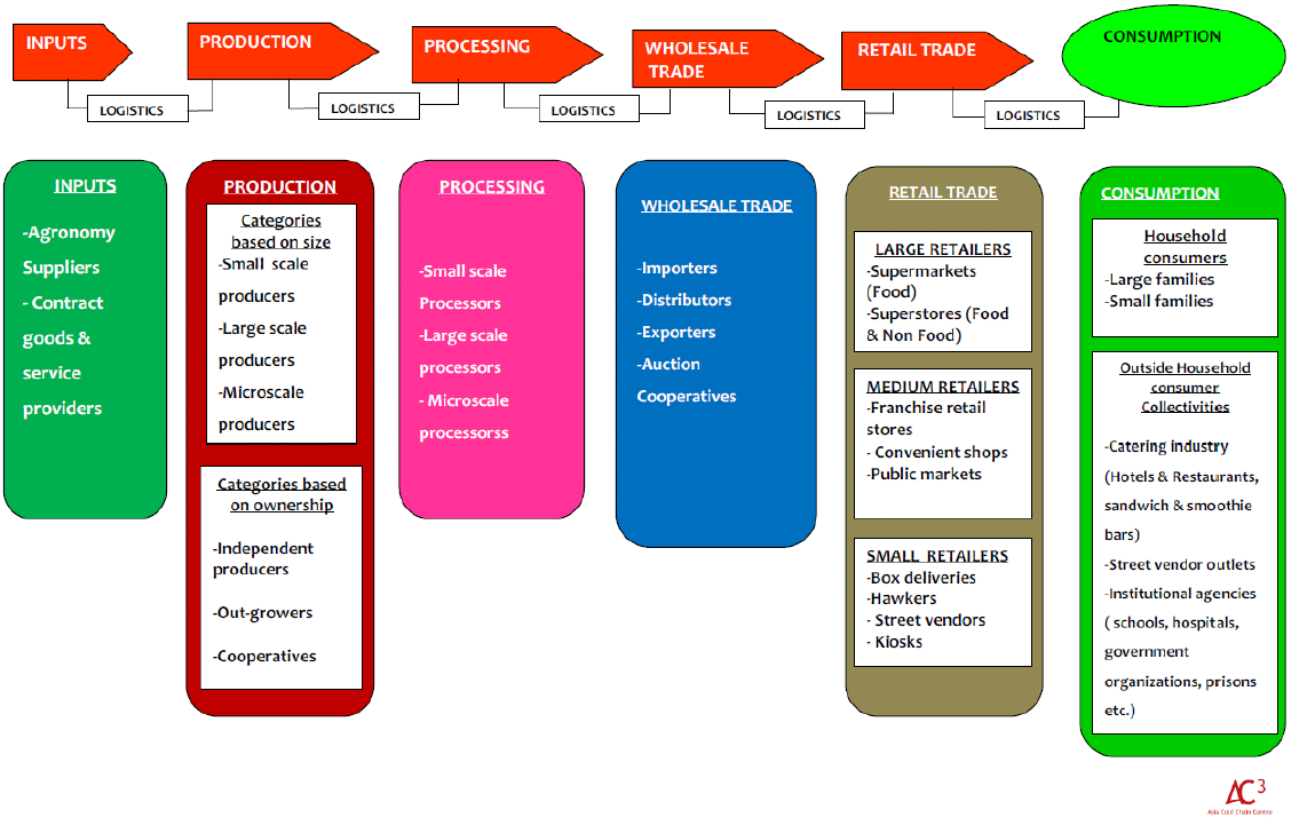
1. 作物與田間:健康的作物以及管理良好的土地,是有機農業的基本要求。
2. 土壤:土壤管理、腐蝕管理、覆蓋及綠肥作物、肥料應用、動物糞肥應用、土壤檢測。
3. 隔離和緩衝帶:風險評估以避免各種可能的汙染源。
4. 種子種苗:非基改、沒有化學藥劑處理。
5. 水源:保持水源的永續性、灌溉系統沒有汙染、某些國家會要求水源品質。
6. 雜草:雜草的多樣性可代表健康的農業生態系、以物理或機械方式控制雜草、覆蓋或綠肥作物可控制雜草。
7. 病蟲害:天敵的棲息、瞭解病蟲害的生命週期、保護方式、監控計畫、病蟲害發生後主動的防治、控制物質。

8. 農場外的投入:投入的資材需被認可、資材要有明確的成分及來源、需跟慣行農法所使用的資材分開。
9. 設施及設備:與慣行農法共用的機械，運用在有機農業前應充分清洗。
10. 分類及標示:需與慣行農法產品有明顯區隔、可追溯性。

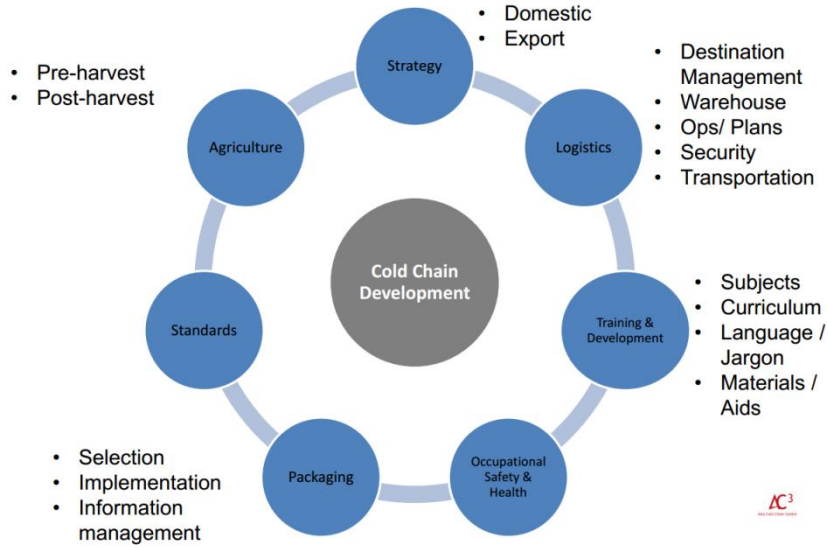
三、主題:發展有效益及有效率的食品價值鏈，提升農產品品質及安全

在亞洲地區，農業面臨許多挑戰，例如市場進入、科技發展程度的差異、地理位置的複雜性和阻隔(山區、島嶼)、氣候變遷等，而在消費者端，世代轉變、教育程度提高、雙薪或小家庭、社群媒體的大量運用以及飲食習慣轉變，都會影響消費者行為。因此，許多有別於以往的需求因應而生。

在農產品儲存及配送過程，針對不同產品需規劃不同的發展策略。在生產端: (1)科技的運用以達成永續生產。(2)提升訓練、推廣和在地服務。(3)風險管理。(4)開發充足的自然資源；而在市場端: (1)發展價值鏈。(2)公私部門合作。(3)標準和食品安全的重視。(4)提升鄉村經濟及行銷通路的多樣性。在產銷過程中需建立持續性的監控點(如下圖1)。



隨著科技發展，可供運用的技術包含田間感測元件和環境控制、環境監測(天氣、地震、火山活動等)、客製化設備、運輸冷鏈系統建立、可攜帶式裝置、硬體建設、電子商務及網際網路和資料分析等。不論在需求預測、供應端、生產端、運輸端或消費端，都已因科技的進步而產生新的面貌。冷鏈系統的運用對於提升農產品品質，具有非常大的助益，與冷鏈發展有關的要素如下圖2:



必須依照農產品的特性，在過程中找出關鍵監控點。而亞洲地區因為硬體設備不足、運輸系統缺乏效率、知識和技術不足、缺乏資金投入以及缺乏標準化的科技等因素，許多地區冷鏈發展仍未臻成熟，造成產品失水、軟化、過熟、被汙染、顏色和質地改變、細菌或真菌感染、營養流失等問題。在冷鏈的過程中，以下幾種方法可供參考運用:設置冷藏庫(屬於比較緩慢但普遍的方式)、覆蓋冰塊(通常用於海鮮)、水冷處理(水的來源很重要，但不適用於已經包裝好的產品)、加壓空氣冷卻(多種產品都適用，可以用在較侷限的空間)、真空降溫(快速)。

在農產品內外銷的過程中，除了運輸過程中的冷鏈系統，其他許多因素亦需納入考量，例如包裝方式(適合運輸、處理和儲藏)、基改/非基改、食品安全(與各國法規符合)、貯架壽命、日期(包裝、加工、最適食用期)、生物安全議題(病蟲害、汙染、欺騙)、抵達消費地的包裝和運輸、可追溯性、使用的語言、禁止使用的成分。而標示的運用，就可涵蓋上述的因素，標示的方式在各國幾乎都受到法規限制，以避免誤導消費者，標示的運用可讓消費者充分瞭解自己買的產品、幫助消費者作選擇，也教育消費者如何安全且正確的食用和儲藏食品。標示的資訊包含食品名稱、成分清單和含量、淨重、每日最低可攝取量、儲藏條件、公司名稱和地址、來源國、過敏原、營養成分、酒精濃度、保存期限、是否為有機產品等，具有可追溯性的QR code也被廣泛應用。

四、分組討論:

各組擇定一項產業，分析其面臨之挑戰、機會及策略方案。本組選擇木瓜產業，所面臨之挑戰包含種植資材的品質、田間管理操作、農地(太小或太大)、投入成本、成熟/採收標準、採後處理(分級、包裝、運輸、科技知識)、買者/出口商對於品質標準的差異。可發展的機會包含鼓勵生產者運用GAP、有機農法，以符合高端市場的需求；提升品質，以提高市場價值；產品加值化，不同的果形大小可以供應不同的市場需求，中型果可能可以

滿足生鮮市場，過大或過小的果實可用於果汁、罐頭加工；電子商務市場的開發。策略方案分為幾個面向進行分析，(1)政府面:建立通用的品質標準、提供教育訓練、建立補助機制(貸款、資材補助等)；(2)技術面:建立包裝場及加工場，集中處理及加工，可降低生產成本，並較易於控管品質；(3)經濟面:(1)廢棄物可運用於肥料製作；(2)拓展多元化通路(市場、電子商務、外銷)。

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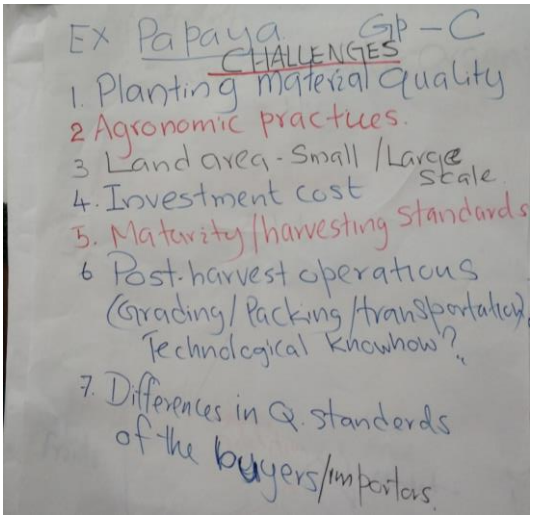
<td> 
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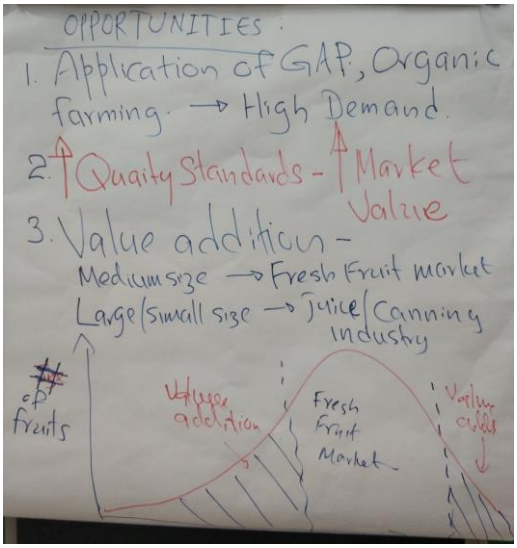
<td> 
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<td>圖3、分組討論-木瓜產業面臨之挑戰</td>
<td>圖4-1、分組討論-木瓜產業之機會</td>
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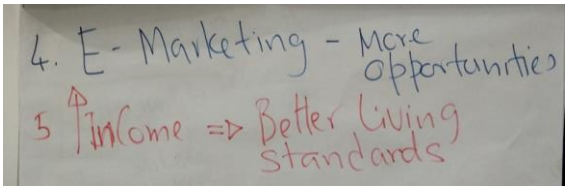
<td> 
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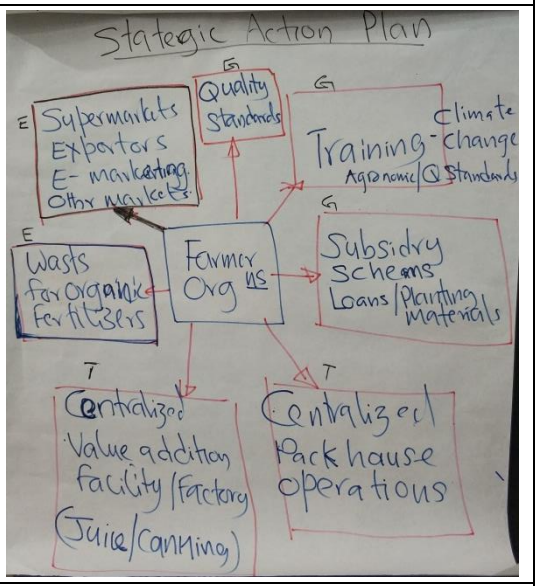
<td> 
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<tr>
<td>圖4-2、分組討論-木瓜產業之機會</td>
<td>圖5、建立行動方案</td>
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</table>

五、實地參訪:

本次參訪的地點為寮國當地種植洋香瓜及番茄之農場(Pawhan Farm)，農場主人為一對年輕夫婦，先生曾經赴中國大陸留學，學習園藝相關知識，農場共有2處，以設施搭建種植番茄以及日本、韓國及臺灣品種洋香瓜，果園環境整潔，已取得寮國良好農業規範(Laos GAP)認證，洋香瓜主要販售於

高端之超市通路，並以網套包裝防撞，未來希望能持續擴展種植面積，並拓銷鄰近海外市場。

本次參與之學員分組針對該農場提供改善建議，例如設施可建置兩道出入門，人員進出開起第一扇門時，第二扇門關閉，以防止昆蟲飛入，待第一扇門關閉時，始開啟第二扇門；包裝可設計供氣體交換之孔洞(以較細的網目阻止動物及其他汙染物飛入)；引進授粉昆蟲；與當地或其他國家種植相同作物之生產者互相交流；運用草生栽培，可保持土壤肥力、濕度土壤溫度，亦可翻入土壤內作為有機質。

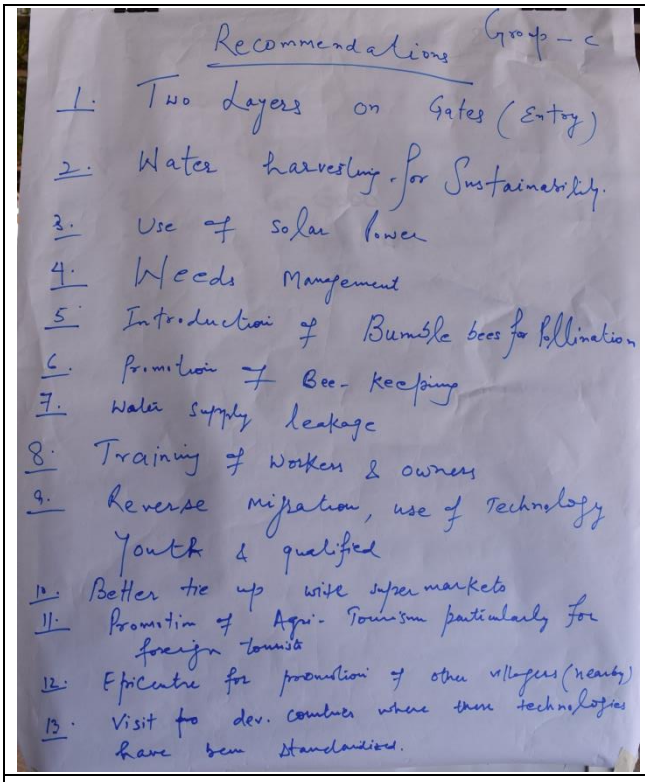

圖6-1、提供農場經營者之建議

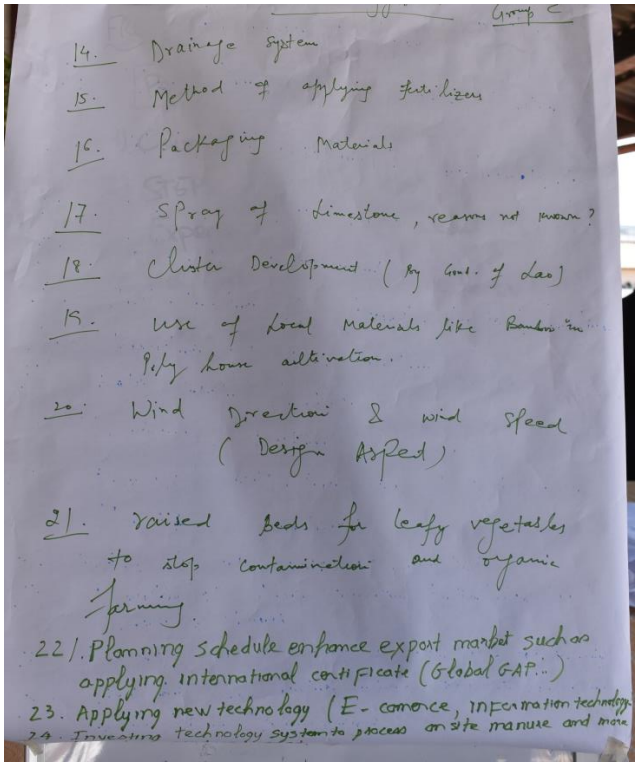

圖6-2、提供農場經營者之建議

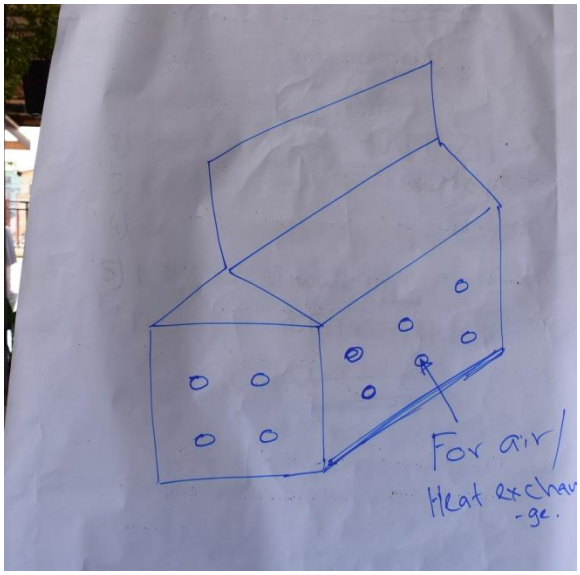

圖6-3、提供農場經營者之建議

肆、心得與建議

本次訓練課程藉由各國講者與參與者之交流討論，瞭解國際間品質標準規範趨勢，以及良好農業規範及有機農業在農產品產銷供應鏈過程中，實際操作上需注意之管控點，期各與會國家建立品質管理規範時，能建立一套有效益、有效率且具可行性之操作模式。

我國在農產品的品質標準規範方面，已建立多種標章機制，包括臺灣農產品生產追溯條碼、吉園圃、產銷履歷(TAP)、台灣優良農產品(CAS)、有機農產品，從生產端至銷售端皆有相關規範需遵守，生產者可根據種植品項、實務操作及銷售通路等評估合適之標章，未來為利消費者辨認及宣傳，也將逐漸整合為「有機農產品」及「TGAP」兩種標章。另外，為拓展國際市場，也積極鼓勵業者取得GLOBALG.A.P.或清真認證。農糧署從107年起透過舉辦GLOBALG.A.P.專題演講，開辦 GLOBALG.A.P.查核點及符合性規範訓練(CPCC)、品質管理系統規則訓練(QMS)，以及危害分析重要管制點(HACCP)系列專業訓練，並委託農業藥物毒物試驗所開設 IPM(害物整合防治)課程，協助有意願申請 GLOBALG.A.P.業者達到申請門檻，目前已有 9 家業者取得驗證，並參加 2019 東京國際食品展，以爭取東京奧運食材供應及國際重要通路之優先採購商機，顯見我國之標章機制推動以具有顯著成效。

在取得認驗證過程中，對於生產者而言，最大的挑戰即是各流程控管點的實際操作方式和需準備的證明文件，藉由這次訓練課程，瞭解各國實際操作方式以及各流程的關鍵管控重點，在我國輔導業者取得認驗證過程中，可協助其規劃易於瞭解及符合實務的操作方式，研擬實施手冊，設計易於填寫的風險評估等控管表格，並訓練輔導人員協助業者，使有意願自我提升之生產者於初期參與時，免於因不得其門而入而耗費時間及金錢，也能促使業者參與意願提升，建立我國農產品安全、安心及可信賴形象，增加於國際市場之市占率及知名度。

伍、附件：

(一)會議相關照片：

<table>
<tr><td> 
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<tr><td>會議現場</td><td>各國參與者自我介紹</td></tr>
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<tr><td>各國參與者合照</td><td>新加坡、日本及韓國講者</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>寮國農場(Pawhan Farm)實地參訪</td><td>Pawhan Farm 所種植之設施番茄</td></tr>
</table>

	
Pawhan Farm 所種植之設施洋香瓜	Pawhan Farm 洋香瓜之包裝設計
	
Pawhan Farm 之生產環境	Pawhan Farm 已取得寮國良好農業規範 (Laos GAP)
	
分組討論	各國參與者取得結業證書

(二)研習報告
Country Paper
18-AG-32-GE-TRC-A

Quality Standards for Agricultural Products in Taiwan

Taiwan (R.O.C.)

10th~14th December 2018

Vientiane, Lao PDR

Ms. Lee Ya Chin
Specialist
Agricultural and Food Agency
Council of Agriculture, Executive Yuan

ABSTRACT

Food safety is a global problem which have gained more and more attention, significantly affects the public health in developed and developing countries. Consumer's demand of purchasing safe and high quality products is growing rapidly. To meet the need, total of 5 systems (4 Labels 1 QR Code) relating to quality standards working in parallel in Taiwan, including Taiwan Agricultural Products Production Traceability QR-code, Safe Agricultural Products (Gi-Am-Pu), Agricultural Traceability Certification (TAP), Certified Agricultural Standards(CAS) and Organic Certification.

Taoyuan Bigger Farm is a good case of quality management, which already got the Safe Agricultural Products (Gi-Am-Pu) logo and passed Agricultural Traceability Certification (TAP). Through clear records from production to sale, establishment of net house and usage of new agricultural machinery, the transparency and traceability make their products trustworthy for consumers, and the high quality and safety also attracts many marketing channels to cooperate with them actively. In the future, our government will keep strengthening producers' awareness and responsibilities of self-control, and integrate 4 Labels 1 QR Code into Organic and TGAP, besides, further assist producers in improving value chain to comply with global standards, like GLOBAL G.A.P., or Halal Certification for Southeast Asian countries, hope to guide them gradually to stay in line with international standard, enhance the industry’s productivity and sustainability.

CONTENTS

1. The current status of quality standards for agricultural products in Taiwan

As a global problem, food safety significantly affects the public health in developed and developing countries. With the development of Taiwan's economy, the food safety issues have gained more and more attention. Consumer's demand of purchasing safe and high quality products is growing rapidly.

Agricultural products go through many procedures from farm to table, including cultivation, harvesting, packaging, storage, processing, washing, sorting etc., the products can be contaminated by many factors at any steps. The major harmful factors include pathogenic microorganisms, pesticide and herbicide residues, those could easily cause food safety problems, and all these problems result not only in public health hazards, but also distrust to the relevant industry and government.

Furthermore, since there are a large amount of agricultural products in Taiwan exporting to China, Japan, Korea, and Southeast Asian countries, the stable quality and safety need to be ensured to get great reputation. Quality standards are just the common language in the international market. It is necessary for us to assist industry to improve agricultural structure and enhance the supply chain, to comply with those technical regulations and mandatory standards which may consistent with or different from countries.

There are no shortcuts to face those important issue, only through the joint efforts and collaboration of government, producers, food industry and consumers, can our industry chain get better and more sustainable development. In Taiwan, *in response to public concerns of food safety and exporting markets expansion, our government has adopted the Good Agriculture Practice (GAP) concept in the 1990s. From nowadays,* considering different need of consumers and feasibility on farmers' side, and to encourage producers to control safety and take up responsibility for what they grow, different levels of systems are designed. A total of 5 systems (4 Labels 1 QR Code) working in parallel now, each provides a different level of safety assurance and traceability penetration. They're introduced briefly as below.

1.1 Primary level: Taiwan Agricultural Products Production Traceability QR-code

This QR-code is applied for free and in a very simple way. Through promotion of this code, consumers may gain timely access to all relevant details (producers’ contact info, photos, as well as origins and overviews) of their products by easily scanning the QR codes, which along the way enhances consumer confidences; distributors may also utilize it to confirm the origins of their purchases and locate the problem within the supply chain to reduce risks of food safety.

1.2 Mid level: Safe Agricultural Products (Gi-Am-Pu)

This is the first implemented system followed by GAP concept, it was largely a product safety-oriented management system rather than a process safety-oriented system. The objective of the system is to ensure the amount of residues of agrochemicals of products are lower than the requirement of food safety regulations. For farmers, the logo represents they should do reasonable pest management, use the agrochemicals which are suggested by authorities, and harvest in appropriate time, and for consumers, it represents a reliable safety index. After the farmer groups pass the agrochemical inspection and reviewing

processes, they are granted the logo and could use it on products. Then consumers can search the products on the website by typing the nine numbers on logo.

1.3 Advanced level: Agricultural Traceability Certification (TAP)

TAP provides certification service for consumers to production process control and product verification, regulating the producers to comply with food safety and sustainable environment standard and certifies by international third-party accredited certification bodies.

The certification mechanisms include the examination to the records of production and quality management system, on-site investigation, products sampling, and violation disciplining. The package time, accredited certification bodies, producers and traceability numbers are all revealed on the logo. After the application is approved, random inspection should be implemented to producers at least once a year, to ensure the traceability are functioning properly.

1.4 Advanced level: Certified Agricultural Standards (CAS)

CAS represents the certification for Taiwan premium domestic agricultural produce and their processed products. The main purpose in promoting CAS logo is to upgrade the quality and add value to domestic agricultural, aquatic, animal and forestry produce and processed products. CAS logo has progressively become the byword for the premium domestic agricultural products, and the logo consist of four unique characteristics, including: (1) meeting national quality standards; (2) meeting hygiene regulations; (3) with intact packing and clear information; (4) using mainly locally-produced raw materials. Accordingly, this make it possible for consumers to differentiate local products from imported ones.

1.5 Highest level: Organic Certification

As one of the most environmentally-friendly farming methods, organic agriculture not only supplies safe and high-quality agricultural products to market but also reduces the pollution impact of production on the environment. Our government has implemented many policy measures to boost the scale of organic production, and in order to make it easier for consumers to distinguish the organic products from others, the Organic Certification mark were introduced.

According to all the relevant regulations, only those certified to be in compliance with organic standards stipulated by the central governing body can be sold under the name of “organic”. To establish credibility for our national organic standards, a third-party certification system has been introduced. Certifiers shall be accredited by government authorized accreditation bodies before carrying out their certification works.

	
Fig.1 Taiwan Agricultural Traceability QR-code	Fig.2 Safe Agricultural Products (Gi-Am-Pu)
	
Fig.3 Agricultural Traceability Certification (TAP)	Fig.4 Certified Agricultural Standards(CAS)
	
Fig.5 Organic Certification	Fig.6 Chrysanthemum Flower with TAP certification

Our policies are in place to encourage consumers to purchase products labeled with those logo. Agricultural agency cooperates with schools, using “4 labels 1 Q” materials for lunch, we hold holiday farmers markets at places within metropolitan regions, and Sale Expo for agri-products that are certified in either organic, TAP, or Eco-friendly. These provide farmers to showcase and publicize their locally grown agricultural products, and they may use these opportunities to share their vision and ideals with consumers face-to-face and boost their sales, and gain the trust and reliability from consumers.

2. Good Case: Taoyuan Bigger Farm

2.1 Background

The owner of Taoyuan Bigger Farm is a young man who was born in 1980s, and his father. Their 5.5-hectare vegetable farmland is located in Bade District of Taoyuan, the main leafy vegetable production area in Taiwan. His father is the leader of the vegetable production and marketing group in Bade District, who once leaded the members to win many awards, and assisted them to get the Safe Agricultural Products (Gi-Am-Pu) logo. In 2013, they went a step further to pass Agricultural Traceability Certification (TAP), and the son won the "TAP Master" which was awarded by Council of Agriculture, Executive Yuan in 2016.

2.2 Strategies

2.2.1 Record completely from production to sale

Management of the farm relies on detailed records. Taoyuan Bigger Farm follows Taiwan Good Agriculture Practice（TGAP）which is formulated by government, and records every step clearly from production to sale, including materials and equipments purchase, cultivation process, fertilizer usage, pest and disease control, harvest and post-harvest management, sale records, chemical residuals inspection, risk assessment, and self examination. Those documents are uploaded to the Agricultural Traceability Certification (TAP) website and opened to the public, every product can be traced back and known when, where and how it produced. The transparency and traceability make their products trustworthy for consumers, and by further analysis, Taoyuan Bigger Farm can figure out Return on Investment and the pros and cons, then improve themselves constantly.

2.2.2 Establish net house to enhance quality

The climate condition is the main factor which affects crop production directly. Typhoon, heavy rain and climate change are seen as huge threats, which may cause severe impact on soil, water, insect, disease, etc.. To reduce the risk of agricultural management from damage of abnormal climate, stabilize supply, and improve the quality, Taoyuan Bigger Farm built net house to cultivate vegetables and tomatoes. This effort not only increases the price of products but also efficiently reduces the cost from disaster loss.

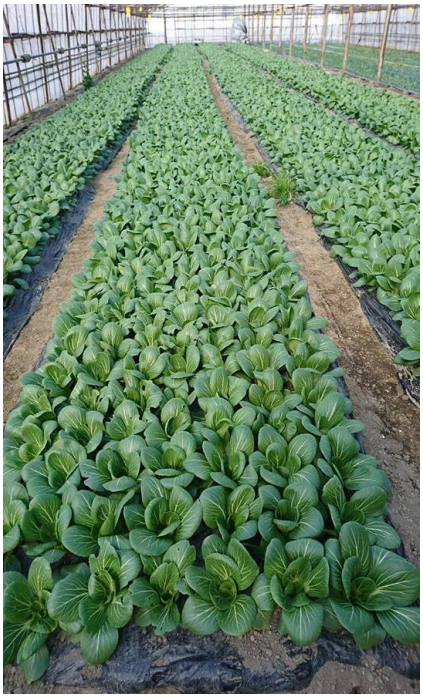

Fig. 7 The exterior of net house (From Taoyuan Bigger Farm's FB)
Fig. 8 The net house to cultivate vegetables

2.2.3 Use new agricultural machinery to improve production efficiency

Agricultural labor ageing and shortage have already been a very important problem in many developed countries, Taiwan is no exception, and vegetable industry is the most serious one. Taoyuan Bigger Farm introduced the leafy vegetable machine from Japan, which combines seeding, insect prevention and harvest, three functions in one. It can save 10 times of labor cost than original, almost NTD 1.7 million per hector a year, and also save 1/3 seeds usage. This machine also makes the distance between two seeds fixed, then the size of plants will grow nearly the same. Using agricultural machinery not only improves production efficiency tremendously, but also is good for

standardization of production, which may become much easier to harvest, grading, packing and sale.

Fig. 9 The leafy vegetable machine

2.3 Achievements

The high quality and safe products of Taoyuan Bigger Farm attract many marketing channels and restaurants to contact actively, then become cooperative partners. The most famous one is Din Tai Fung(鼎泰豐), which was founded in Taipei, Taiwan in 1958, then transitioned into a full fledged restaurant specializing in Xiao Long Bao, soup dumplings and noodles in 1972, and now its locations are expanded in Taiwan, the United States, Japan, Singapore, South Korea, Australia, Indonesia, Malaysia, China, and Thailand. As a worldwide famous enterprise like Din Tai Fung, the safety and quality of every ingredient must be controlled cautiously. The management went to Taoyuan Bigger Farm in person several times, to make sure that the vegetables (Chinese mustard) fill the bill, and purchase them in a good price. Almost a quarter of 8,000 kg production per week of leafy vegetables are distributed to Din Tai Fung. Taoyuan Bigger Farm also cooperates with Wowprime Corp (王品集團), the nation's largest restaurant chain operator who operates 19 brands, and FamilyMart convenience store in Taiwan.

Fig. 10 The logo of Din Tai Fung(鼎泰豐), and the most famouse Xiao Long Bao

Fig. 11 The dumplings whose vegetables wrapped inside are from Taoyuan Bigger Farm

2.4 Challenges and opportunities

The appropriate production seasons of vegetables are different from varieties, in order to meet the rising consumers' demand, how to draw up a cultivation plan in advance becomes very important. Besides, to stabilize the supply, expanding the cultivation area would be necessary in the future, but which means more equipments, facilities, labor and capital are needed to invest in, and how to assess Return on Investment would be critical. And also, how to encourage consumers to purchase those products labeled with logo or certification more willingly and frequently, which are usually sold in higher price, is also a big challenge.

Taoyuan Bigger Farm has been keeping trying more and more different varieties of vegetables to discover new customers, and improving pre-cooling and distribution systems to keep the color of leaves green, even went to Japan and other countries to exchange experiences and learn new techniques. Those efforts all make them gain a foothold in vegetable industry in Taiwan, save them from low price competition, and win good reputation and trust from numerous consumers.

3. Conclusion

There have already been many good cases of implementation of quality standards in Taiwan, and many assistant measures introduced by government to strengthen producers' awareness and responsibilities of self-control. Those five agricultural quality standard marks that our government promoted vary in regulations, system content, certification mechanism and the need of producers and consumers. To make it easier for consumers to recognize and identify the meaning of the labels, the integration of the labels came into effect. Taking safety and sustainability into consideration, those certification marks would be integrated into Organic and TGAP, which combining the advantages of Good Agriculture Practice (GAP), CAS and

TAP. By the end of 2020, an integrated agricultural product certification system that is reliable, transparent and easy to understand for producers and consumers would be completed.

Besides, our government further assist producers in improving value chain to comply with global standards, like GLOBALG.A.P., or Halal Certification for Southeast Asian countries, which are the very important trade partners for Taiwan. We also set up training courses regularly and partially subsidize certificate fee, hope to guide producers gradually to stay in line with international standard. In the future, our government will continue to put efforts into agriculture, assist them in adopting quality standards concepts and expanding market opportunities with proper strategies, in hopes of enhancing the industry's productivity and sustainability.

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