出國報告書（出國類別：出席國際會議）

赴韓推動氣候變遷調適夥伴及洽談巴黎協定相關機制

服務機關：行政院環境保護署
姓名職稱：簡慧貞 參事兼執行秘書
派赴國家：韓國
出國期間：民國 **105** 年 **3** 月 **15** 日至 **3** 月 **18** 日

摘要

西元 2015 年 1 月 12 日韓國正式啟動碳交易制度，為進一步了解韓國運作碳交易機制經過一年後的進展、過去所面臨的挑戰與因應策略，以及未來規劃，同時掌握韓國初期如何推動碳交易之相關事宜，包含可量測、可報告及可查驗（Measurable Repor and Verifiable，簡稱 MRV）制度、碳交易制度法源、設計、相關關係人溝通、實際執行經驗等，本次行程拜會韓國環保部、韓國環境研究院，商討其政策及碳交易制度的規劃，相互分享雙方經驗，以建立未來雙邊合作的基礎；在調適方面，掌握韓國國家因應氣候變遷現況和氣候調適策略，了解國際間對氣候變遷及相關環境資訊之應用與作法，促進臺灣與韓國雙方氣候變遷調適事務，並尋求未來國際合作契機。

另本次行程規劃出席出席韓國高麗大學舉辦之 Carbon Science Economics Convergence Research for Mid-Latitude Ecotone 國際研討會，由韓國大學 Woo-Kyun Lee 教授於今（105）年訪臺期間邀請本署簡參事兼執行秘書慧貞分享我國臺灣溫室氣體政策推動現況，並與韓國專家進行韓國氣候變遷調適相關資訊及前瞻作法交流，對於推動本署氣候變遷調適業務、教育訓練與國際接軌之契機，極有助益。

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壹、 會議過程及內容

一、背景說明及目的

「中緯度」可被廣泛定義為半球緯度 30 度至 60 度之間的區域，由於高緯度和低緯度的盛行氣團在此交匯，本區域的氣旋活動頻繁。中緯度內陸地區的氣溫與沿海差異較大，內陸大陸性較強。依據此區間的人口統計資料與經濟發展程度，全球大約百分之 50 的人口在此居住，位居中緯度的許多國家大部分面臨氣候變遷的衝擊與挑戰相對提高。依據氣候科學的預測，持續的氣候變遷將在 21 世紀增加旱災頻率以及植被缺水的壓力，即使是微小的氣候指標例如溫度或降水的改變，對於中緯度的許多國家境內的土地（組成大部分為旱地或沙漠），都可能對此區域的生態系統造成實質的衝擊。位居中緯度的韓國於西元 2016 年 3 月 16 至 17 日由韓國大學(Korea University）舉辦氣候變遷學術研討會，目的是針對北緯 20 度至 40 度間的中緯度區域進一步進行氣候變遷相關研究分享及交流。該校 Woo-Kyun Lee 教授於今（105）年 2 月份訪臺期間邀請本署簡執秘出席參加上述研討會，分享我國臺灣溫室氣體政策推動現況，及與韓國專家進行交流韓國氣候變遷調適相關資訊及前瞻作法。

另韓國已於西元 2015 年 1 月 12 日正式啟動碳交易制度（Emission Trading System, ETS），截至西元 2015 年 12 月韓國 ETS 整體交易量約 440 萬噸，其交易總額為 4100 萬美金，包含了配額（Korean Allowance Units, KAUs）與抵換額度（Korean Carbon Units, KCUs），為進一步了解韓國運作碳交易機制經過一年後的進展、過去所面臨的挑戰與因應策略，以及未來規劃，同時掌握韓國初期如何推動碳交易之相關事宜，包含可量測、可報告及可查驗（Measurable Repor and Verifiable，簡稱 MRV）制度、碳交易制度法源、設計、相關關係人溝通、實際執行經驗等，本次行程拜會韓國環保部和韓國環境研究院，商討韓國（Intended Nationally Determined Contribution, INDC）、ETS 機制及國家調適政策的規劃，相互分享雙方經驗，在碳交易制度方面，掌握韓國運作碳交易機制現況及未來推動規劃內容，共享雙邊經驗，以建立未來雙邊合作的基礎。對於調適方面，掌握韓國國家因應氣候變遷現況和氣候調適策略，了解國際對氣候變遷及相關環境資訊之應用與作法，促進臺灣與韓國雙方氣候變遷調適事務，並尋求未來國際合作契機。

二、活動會議行程

本次赴韓國拜會韓國環保部、韓國環境研究院，及出席 Carbon Science Economics Convergence Research for Mid-Latitude Ecotone 研討會相關行程如下表所示。

日期	地點	拜會對象/參與會議
3月14日（一）	臺北→仁川機場→首爾	啟程前往韓國。
3月15日（二）	首爾	拜會韓國環境研究院（Korea Environment Institute, KEI）環境政策研究小組首席研究員 Dr. Yong-Gun Kim，交流碳市場機制的發展。
3月16日（三）	世宗市	一、 拜會韓國環境部氣候與空氣政策局 Mr. Jung-Kyun Na，討論韓國 ETS 經驗。 二、 拜會韓國環境研究院韓國氣候變遷調適中心主任 Dr. Jeong-ho Lee 討論南韓調適政策之規劃與推動。
3月17日（四）	韓國高麗大學	出席國際研討會議
3月18日（五）	首爾→仁川機場→臺北首爾	返臺。

三、 活動會議概述及成果

本次行程為掌握韓國 INDC、碳交易機制和國家調適推動現況，本次行程拜會韓國環境部及韓國環境研究院（Korea Environment Institute, KEI），由韓國環境部氣候與空氣品質政策局局長 Mr. Jung-Kyun Na 主持，由副組長 Ms. Jeonghyun Emily Park 首先介紹韓國（Intended Nationally Determined Contribution, INDC）之目標與策略研議過程，雙方就碳市場交易制度之規劃、挑戰、因應策略的經驗進行交流分享，並邀請他們來臺參加今（105）年 6 月份由本署規劃舉辦之區域性氣候政策與碳市場國際研討會，韓方建議我方可以環保署名義直接邀請韓方環境部，不須透過我駐韓代表處與韓國外交部進行，以避免延長連繫時間；拜會韓國環境研究院（Korea Environment Institute, KEI），該院首席研究員 Dr. Yong-Gun Kim 對巴黎協定對韓國的影響表示樂觀，韓國雖然最近修改綠色成長法（Act on Low Carbon, Green Growth），調整部會權責分配，但不會影響韓國的 INDC 於 2020 年減量目標，未來韓國將透過量化模型

分析（KEEI_EGMS, the Korea Energy Economics Institute Energy and GHG Modeling System）及與業者多方討論後訂定 INDC 的目標，未來亦將參考巴黎協定每五年檢核一次的機制進行修訂，並而最近排放交易制度的修改，也可能會影響之前環境部的整體規劃方案。Dr. Kim 曾經參與國際推動一般均衡模型（Computable General Equilibrium, CGE）與 Multiregional 模型的研究，分析氣候減緩政策對經濟和環境的影響，他建議韓國與我方相對單位可以在評估模式方面進行具體的雙邊合作，並可以透過 KEI 進一步尋求與其他國際機構合作，將有助於我國未來研擬階段管制目標與碳洩露評估。

另出席 Carbon Science Economics Convergence Research for Mid-Latitude Ecotone 研討會，該會議由韓國大學與國際應用系統分析研究所（International Institute for Applied Systems Analysis, IIASA）共同舉行，並由 IIASA 研究所執行長 Dr. Pavel Kabat 教授首先進行開幕致詞，參加人數共 53 位（如圖 8 所示），包含專家講者，其主辦單位彙整會議結論及成果（如附件）並公布作為推動政策的參考。本署簡執秘出席該研討會，分享我國臺灣溫室氣體政策推動現況，並表示本署氣候變遷調適夥伴正在推動區域調適網絡，將與美國麻省理工學院（Massachusetts Institute of Technology, MIT）氣候合作實驗室（Climate Colab）籌辦氣候變遷調適競賽活動，未來期望與泛太平洋地區國家進行氣候調適與創新進行合作，共築氣候變遷調適夥伴關係，以因應氣候變遷的挑戰。

貳、 雙邊與專家交流

一、 韓國環境研究院與氣候變遷調適中心（Korea Environment Institute, KEI）

(一) 會晤對象

- KEI 環境政策研究小組首席研究員 Dr. Yong Gun Kim
- KEI 氣候變遷調適中心主任 Dr. Jeongho Lee

(二) 組織介紹

韓國環境研究院（Korea Environment Institute, KEI）的前身為韓國環境技術研究院（Korea Environmental Technology Research Institute, KETRI）。KETRI 於西元 1992 年 4 月由南韓總理批准成立，直至西元 1997 年 9 月才解散，同時依據環境影響評估法（Environmental Impact Assessment Act）成立 KEI，該機構為韓國政府資助的研究

機構，隸屬於韓國總理辦公室，主要是參與有關解決環境挑戰及促進永續發展 等相關議題的政策制定，提供諮詢和資訊。KEI 目前可分成五個部門/中心（如圖 1），各部門/中心所負責之研究領域皆有所不同。

KEI 主要的研究領域如下所述：

1. 環境經濟：低碳能源政策、環境政策的經濟分析和自然資源的經濟價值評估、環境經濟模型和數據發展、綠色產業和技術、環境金融、清潔生產和綠色消費。
2. 氣候變遷：溫室氣體減量政策的發展、氣候變遷和調適的影響評估、南韓受氣候變遷影響和脆弱性的評估與分析、氣候變遷調適和實施規劃之工具發展。
3. 環境管理與風險評估：環境衛生、風險評估和管理、整合環境管理、氣候變遷對環境衛生之影響、化學物質的國際監管策略、物質管理策略與技術、土壤管理和恢復、空氣品質管理政策與技術。
4. 水資源：水資源的中長期策略與政策制定、因應氣候變遷的水資源管理政策、水質與水環境之管理、水供應、污水和地下水之管理、水資源相關管理技術。
5. 環境規劃與生態:國家環境管理與規劃、生態系統和生物多樣性之維護與恢復、自然資源的保護與管理、環境影響評估、政策環境評估和環境影響評估系統、開發計畫的環境影響預測/減緩技術、再生能源和其它開發計畫的環境評估措施、社會/經濟領域的環境評估指標之發展、主要開發計畫，提升其後期的監測方法。
6. 國際合作：培訓課程、國際會議

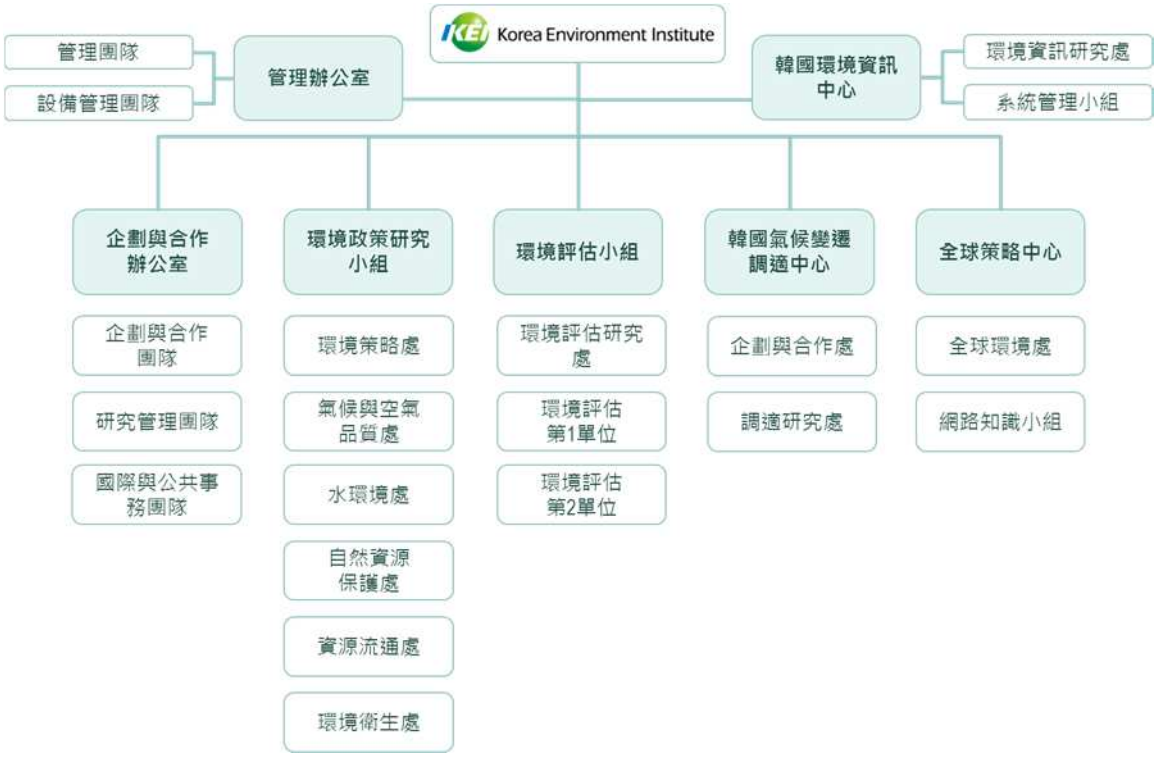


圖 1. 韓國環境研究院（KEI）組織架構

(三) 會晤摘要

拜訪 KEI 環境政策研究小組氣候與空氣品質處之首席研究員 Dr.Yong Gun Kim（如圖 2），Dr. Kim 研究氣候政策已超過 20 年，包含排放交易、碳稅和國際協議等議題，並且多次受邀來臺參加相關研討會。本次交流，Dr. Kim 表示對於巴黎協定對韓國的影響表示樂觀，韓國雖然最近修改綠色成長法（Act on Low Carbon, Green Growth），調整部會權責分配，但不會影響韓國的 INDC 於 2020 年減量目標，未來韓國將透過量化模型分析（KEEI_EGMS, the Korea Energy Economics Institute Energy and GHG Modeling System）及與業者多方討論後訂定INDC的目標，未來亦將參考巴黎協定的規劃，以每五年檢核一次的機制進行修訂，而最近排放交易制度的修改，也可能會影響之前環境部的整體規劃方案。Dr. Kim 曾經參與經濟合作暨發展組織（Organisation for Economic Co-operation and Development，OECD）之一般均衡模型（Computable General Equilibrium, CGE）與 Multiregional 模型的研究，其內容著重分析氣候減緩政策對經濟和環境的影響，他表示樂意與我方分享經驗，並可考量韓國與我方研究機構建立雙邊合作關係，建議韓國與我方相對單位可以在評估模式方面進行具體的雙邊合作，可透過 KEI 進一步尋求與其他國際機構合作，將有助於我國未來研擬階段管制目標與碳洩露評估。

另外，拜會 KEI 氣候變遷調適中心（Korea. Adaptation Center for Climate Change,

KACCC）主任 Dr. Jeongho Lee（如圖 3），Dr. Lee 表示 KEI 氣候變遷調適中心作為為韓國總理府的幕僚執行單位，負責推動韓國國家調適政策，目前該中心內正式人員共 26 位，其中心經費每年預算約新臺幣一億元。該單位已彙整韓國的第一版國家調適報告，包含中央政府與地方，也建立許多政策工具，充分整合政府各單位。Dr. Jeongho Lee 於簡報介紹韓國調適政策推動現況，對照臺韓雙方的國家調適政策，發現有許多值得我國學習之處，像是在資料整合上，整合各部會、各地方之脆弱度及未來情境，實質建立政策工具平台，公開讓民眾了解；實際執行上，其充分與產業、年輕人等相關利益關係人結合，非僅由學術界的調查報告而已，並將氣候變遷推廣到企業界上。此外，韓方在氣候變遷調適上，已建立各種模型及政策工具，經過雙方討論，非常值得本署對於氣候變遷調適相關業務後續合作及交流，對於未來共同合作，韓方表達高度意願。

圖 2. 與 KEI 首席研究院 Dr.Yong Gun Kim 會晤

圖 3. 與 KEI 氣候變遷調適中心主任 Dr. Jeongho Lee 會晤

二、 韓國環境部（Ministry of Environment）

(一) 會晤對象

- 韓國環境部氣候與空氣品質政策局長 Mr. Na, Jung-Kyun。

(二)　組織介紹

韓國環境部（Ministry of Environment）是韓國負責環保部門的主管機關，該機構負責執行法規、贊助生態研究、管理韓國國家公園，以保護韓國生態環境和提高人民生活品質，確保民眾可以享受自然環境、乾淨水資源和天空，並且納入韓國氣象廳，促進因應氣候變遷的策略，其機構總部位於世宗市。其組織（如圖 4）沿革如下所示：

- 西元 1967 年 02 月 17 日：保健社會部保健局環境衛生課設立。
- 西元 1980 年 01 月 05 日：設立環境廳，為保健社會部的外廳。
- 西元 1990 年 01 月 03 日：設立環境處。
- 西元 1994 年 12 月 24 日：改組為環境部。
- 西元 2008 年 02 月 29 日：政府機構改革，氣象廳由科學技術部移交環境部。

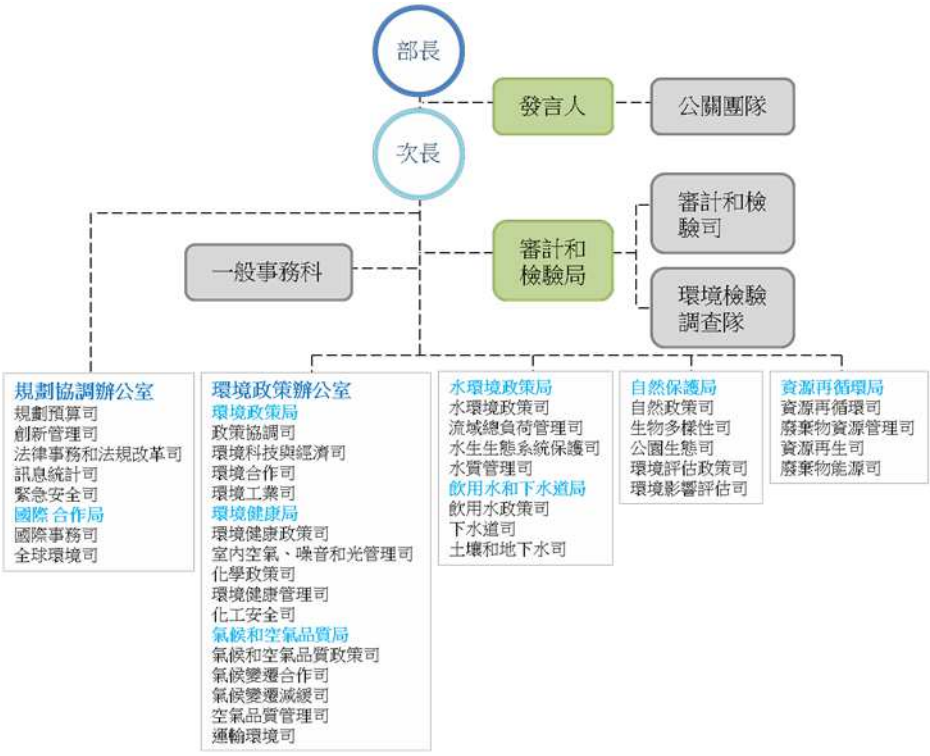


圖 4. 韓國環境部組織架構

(三)　會晤摘要

本次拜會韓國環境部氣候與空氣品質政策局局長 Mr. Jung-Kyun Na（如圖 6），由氣候與空氣品質政策局局長 Mr. Na 主持，Mr. Na 局長首先介紹該局主要職掌以負責制定韓國整體氣候變遷與空氣品質的保護政策、管理空氣污染物、機動車污染防治、清潔燃料和氣候變化的規畫及預防措施。接著，由該局組長 Ms.Jeonghyun Emily Park 介紹韓國 INDC 之目標與策略研議過程，在韓國的 INDC 中，對於減量

目標，韓國承諾綜合所有經濟部門在西元 2030 年要比基線情境（Business As Usual, BAU）排放水準（850.6 百萬公噸二氧化碳當量）再減少 37%的溫室氣體排放量。依據《低碳綠色成長基本法》的內容，韓國將持續在所有經濟部門努力做出因應氣候變遷各項挑戰，並且為達成西元 2030 年減量目標將強化各方面的努力。韓方表示，目前暫無修正西元 2020 年目標計畫，係因已與業者多方討論與溝通後，未來將參照方法學及巴黎協定每五年檢核一次的機制等考量因素後再行調整，故在近期內不會修改，他們預計在西元 2020 年才會再進行一次修正。此外，韓國將正式於 4 月 22 日地球日當天，於紐約聯合國大會簽屬巴黎氣候協定。

另外，韓國於西元 2015 年初宣布正式成立碳市場機制，且實施總量管制（cap and trade）機制已有一年執行經驗，所面臨問題與困難，即由韓國總理府最近修改制度部會分工，碳市場交易制度主管由環境部轉為財政部，政策上仍為環境部負責，其他目的事業主管負責各部門業務，但因為制度剛修改，可能要半年後其部會分工與執行狀況才會較明朗。

我方則由簡執秘引言，並介紹我國溫室氣體減量及管理法與積極推動氣候變遷調適夥伴（Pan Pacific Adaptation on Climate Change, PPACC）合作努力與成效。雙方以 INDC、碳市場及氣候調適等議題，充份交換意見。最後，我方欲邀請他們來臺參加 6 月份環保署規劃舉辦之區域性氣候政策與碳市場國際研討會，韓方建議由我方環保署直接邀請韓方環境部，不須透過我駐韓代表處與韓國外交部進行，以避免延長連繫時間。

圖 5. 與韓國環境部人員合影

圖 6. 與韓國環境部 Mr. Jung-Kyun Na 會晤

三、 Carbon Science Economics Convergence Research for Mid-Latitude Ecotone 國際學術研討會

(一) 會晤對象

- 韓國 Brain Korea 21 辦公室主任 Dr. Woo-Kyun Lee

(二) 會晤摘要

韓國於西元 2016 年 3 月 16、17 日由韓國大學（Korea University）舉辦氣候變遷學術研討會，會議主題是中緯度過度地區碳科學經濟融合（Carbon Science Economics Convergence Research for Mid-Latitude Ecotone），會議目的是針對北緯 20 度至 40 度間的中緯度區域進行氣候變遷相關研究分享及交流。會議開始，由 IIASA 研究所執行長 Dr. Pavel Kabat 教授首先進行開幕致詞，參加人數共 53 位（如圖 8），包含專家講者，其中本署簡慧貞執秘介紹我國溫室氣體減量及管理法，明確指出國家溫室氣體長期減量目標、確立中央部會及地方政府的權責分工、納入五年一期之階段管制目標，以及提供籌設基金資源的法律基礎等，將讓我國得以逐步提升因應氣候變遷的能力；依據我國通過的溫室氣體減量與管理法中，針對調適部分及我國國家調適政策綱領目前進度提出說明，以及過去兩年臺美氣候變遷合作進行成果分享，共有 13 個國家合作進行，共舉辦兩次國際研討會，並於法國巴黎氣候會議 COP21 期間共同宣布推動夥伴關係，與成員國家建立良好互動，並有相互合作計畫及協議產生，實質推動「泛太平洋氣候變遷調適夥伴」有相當好的成效，期望與亞太地區國家合作，共築氣候夥伴關係，以因應氣候變遷衝擊。

會後，與韓國大學 Dr. Woo-Kyun Lee 主任進行商討氣候變遷調適合作規劃，Dr. Lee 主動提出臺灣與韓國雙方可針對氣候變遷調適相關業務進行交流，實質進行

人員互訪、資訊交流及會議參與、共同尋求合作方案/計畫之可行性。我方表達歡迎可進行推動，未來應積極強化交流溝通。另相關議程及簡報請詳附件。

圖 7. 中緯度過度地區碳科學經濟融合（Carbon Science Economics Convergence Research for Mid-Latitude Ecotone）研討會現況

圖 8. 研討會所有與會者合影

參、 成果與建議

一、成果

(一) 於因應氣候變遷議題上，本次赴韓國環境部參訪行程，由韓國環境部氣候與空氣品質政策局相關代表與窗口主動聯繫與接待，顯示臺韓兩方對於氣候變遷議

題具有共識，其交流管道暢通。本次與會期間，臺韓兩方於會中討論熱烈，且相互分享近一年兩國國家氣候計畫歷程，分享經驗和交流。

(二) 韓國 INDC 目標已設定在西元 2030 年，以基線情境（BAU）減 37%為目標，相較於我國減量 50%為寬鬆。韓國目前暫無修正西元 2020 年目標，係因已與業者多方討論與溝通後，未來將參照方法學及巴黎協定五年一次檢核機制等考量因素後再行調整，故在近期內不會修改，預計在西元 2020 年才會再進行一次修正。此外，韓國官方表示將正式於 4 月 22 日地球日當天，於紐約聯合國簽屬巴黎氣候協定。

(三) 韓國的 INDC 目標係透過量化模型分析（KEEI_EGMS, the Korea Energy Economics Institute Energy and GHG Modeling System）及與業者多方 討論後訂定，未來亦將參考巴黎協定五年一次檢核機制進行修訂，至於如何達成目標，目前尚無具體配套措施，如效能標準等，故完全係依靠 cap and trade 機制。其機制主要係依據 2010 年「低碳綠色成長基本法(Framework Act on Low Carbon, Green Growth）」第 46 條 （Introduction of Cap and Trade System），訂定「溫室氣體排放許可分配及交易法」進行規範。

(四) 韓方在西元 2015 年初宣布正式成立碳市場機制至今，經歷一年執行經驗，所面臨問題與困難，即由韓國總理府修改制度部會分工，碳市場交易制度主管由環境部轉為財政部，其相關政策上仍為環境部負責，其他部門負責自身業務，但因為制度剛修改，可能要半年後與其他部會分工與執行狀況才會有具體的成效。

(五) 為穩定市場發展，韓國碳定價係由政府與企業進行協商，將企業持有配額的最大/最小限制、修訂借用配額的限制、價格上限/下限等監管機制納入考量。但其目前碳市場的 KAUs 配額交易與 KCUs 僅少數零星交易活動，其主要是因為受管制業者認為核配過少，而不願意將持有的碳額度拿出進行交易，因此韓國未來碳交易市場穩定機制時間仍值得關注。

(六) 韓國調適策略主要依「韓國氣候變遷對策基本法」（Act on Climate Change），訂定 5 年一期的「國家氣候變遷調適總體計畫（National Climate Change Adaptation Master Plan）」，並由環境部主導政策規劃，具體工作執行則委託一 NGO 協助推動與落實。

二、建議

以下針對與韓國各單位進行後續交流與合作之建議：

(一) KEI Dr.Yong Gun Kim 與我方已經有十多年的交流，也多次來臺參加研討會，與我方關係良好，這次也主動表示 KEI 與我方相對單位可以在評估模式方面進行具體的雙邊合作，其除了主導韓國模型評估之外，也曾經參與 OECD 之 CGE 與 Multiregional 模型研究，分析氣候減緩政策對經濟和環境的影響，國際管道暢通。因此，建議透過 KEI 進一步尋求與其他國際機構合作，將有助於我國未來研擬階段管制目標與碳洩露評估。

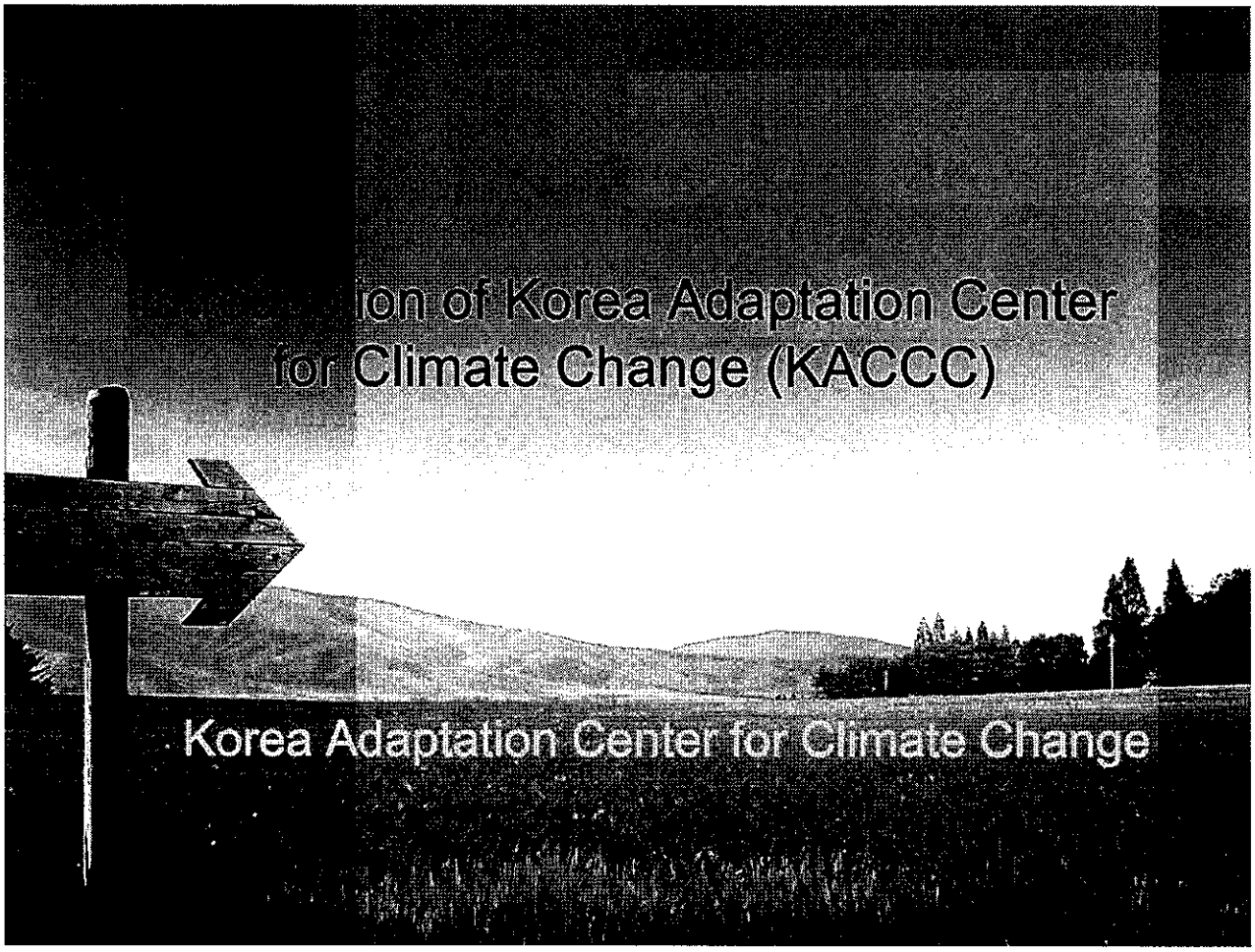
(二) 我方欲邀請韓國環境部來臺參加今（105）年本署規劃舉辦之國際研討會，韓方建議由我方環保署直接邀請韓方環境部，不須透過韓國外交部進行，以避免延長連繫時間。對於臺韓環境合作，未來還是需要外交體系多從旁協助。

(三) KACCC 為韓國國家調適計畫之主責研究機構，已建立各種模型、平臺及政策工具，經過雙方討論，值得後續合作及交流，韓方亦表達高度可行的看法。建議可建立臺韓氣候變遷調適工作小組之交流管道，針對氣候變遷推廣到企業界，作為我國推動企業端氣候變遷調適參與機制之借鏡。

(四) 韓國綠色成長法修訂、部會權責分配、階段管制目標與部門減碳責任之作法與評析，建議透過 KEI 之合作，參與 OECD 之 CGE 與 Multiregional 模型研究，分析氣候減緩政策對經濟和環境影響，建立雙方研究機構合作關係。

(五) 為促進臺韓正式互訪交流，建議先寫邀請來臺參加會議，建立雙方互訪管道，再研擬雙邊氣候變遷合作協議之可行性，進行雙方實質官式交流。

肆、 附件



KACCC as a Legal and National Center for Climate Change Adaptation (CCA)

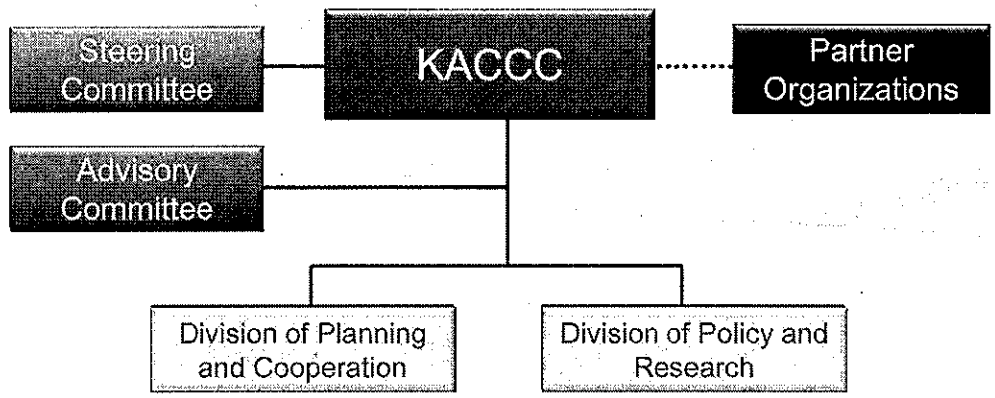
Establishment of KACCC

- KACCC was established on July 1, 2009, based on "the Ministry of Environment Instruction No. 850".
- The items on the operation of KACCC was legalized by "the Clean Air Conservation Act" (Revised on May, 2012).
- The center collaborates closely with the Ministry of Environment.

Main Roles of KACCC

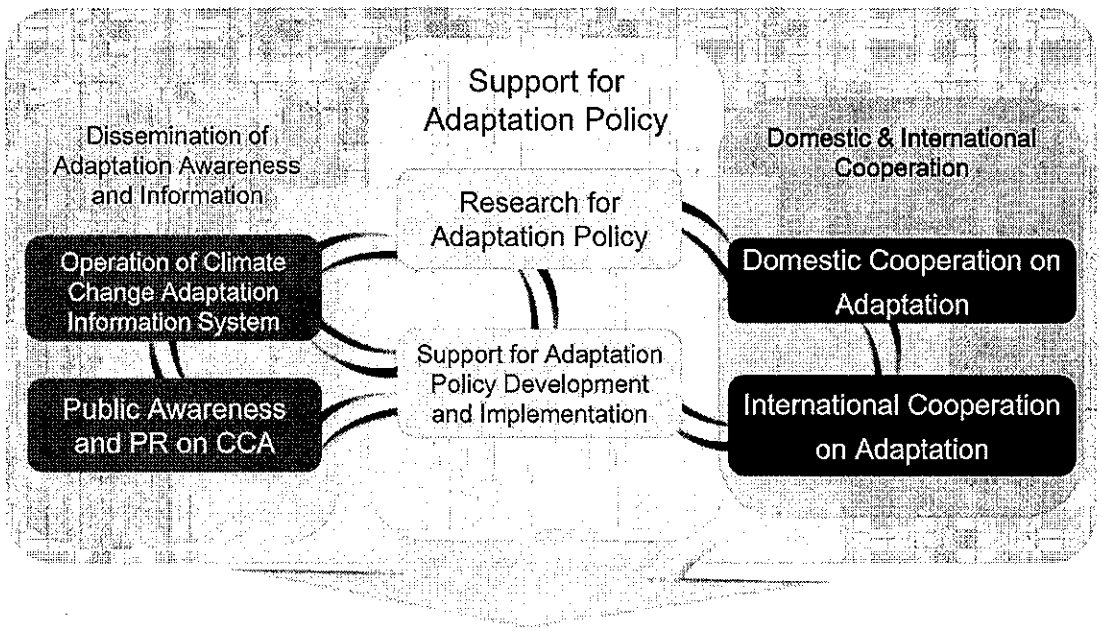
- Support development and implementation of CCA policy and plans
- Provide information & enhance awareness on CCA
- Establish national and international networks
- Carry out researches regarding CCA

Organization of KACCC

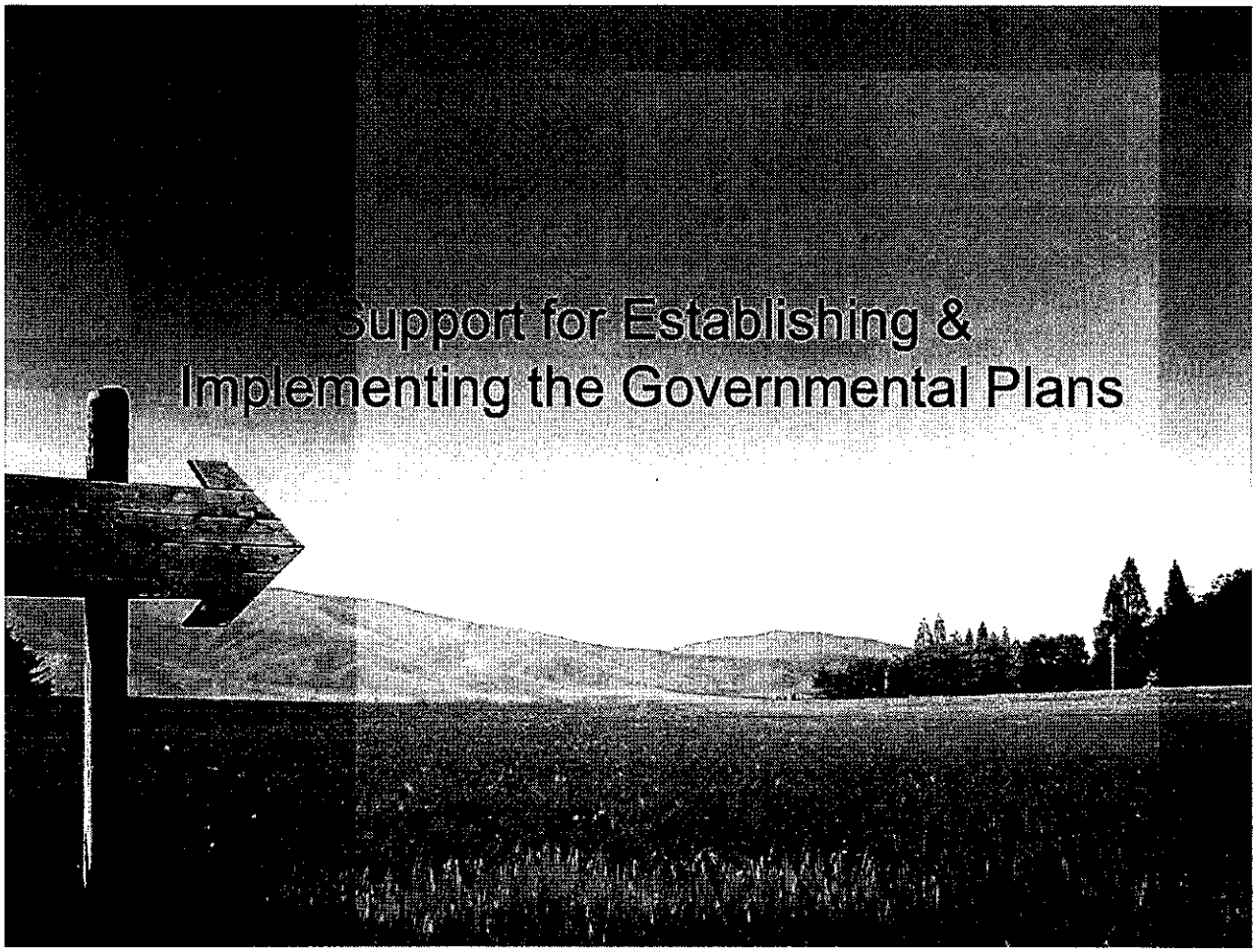


Director	Administration	PhD-level Researchers	Master-level Researchers	Bachelor-level Researchers	TOTAL
1	2	11	38	2	54

Supporting Task of KACCC



Leading Policy Development and Research
for Enhancement of National Adaptation Capacity

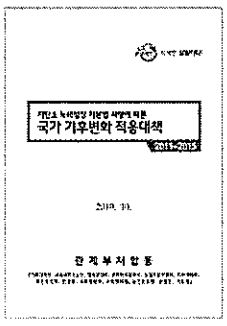


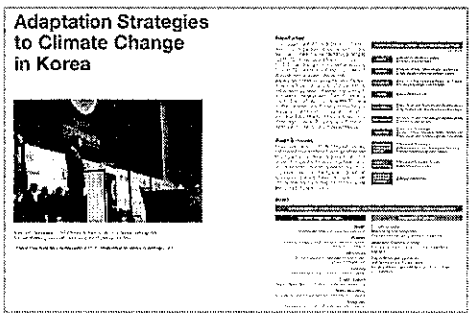
Support for Establishing the NCCAMP

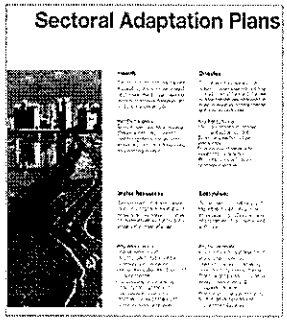
Korea Environment Institute

Korea Adaptation Center for Climate Change

1. Organize and operate an expert forum, a working level execution team, and a supervisory meeting to prepare a draft
2. Play a role of mediation, exchanging information and collaborating among central departments
3. Publish and distribute the NCCAMP (in 5 year term)







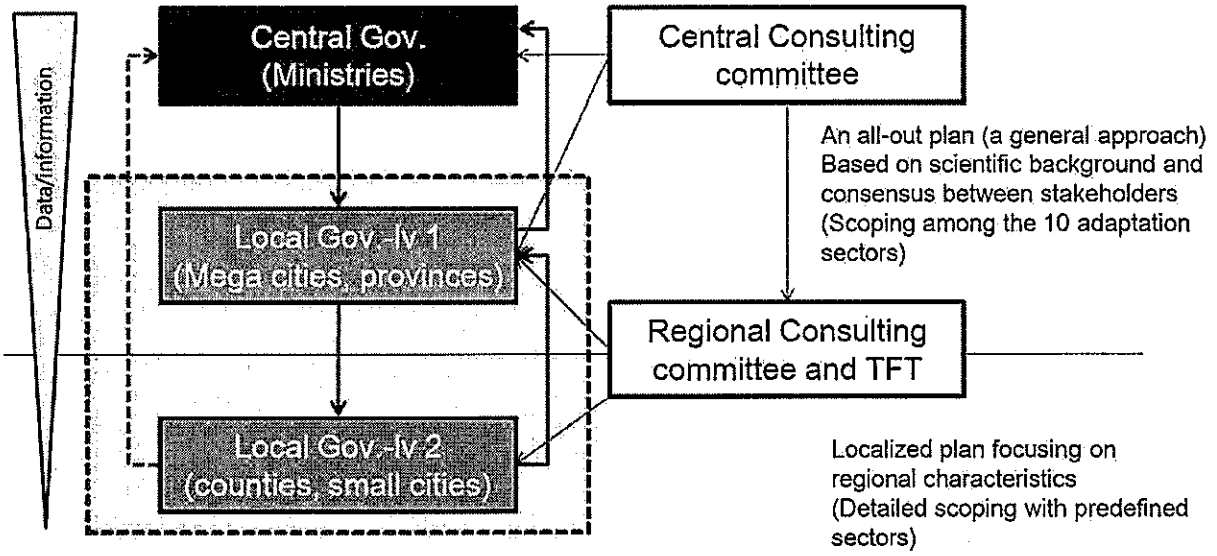
A printed copy of the NCCAMP and contents of the brochure

* NCCAMP : National Climate Change Adaptation Master Plan

Support for Establishing the NCCAMP

Korea Environment Institute

Flow of Planning Process and Challenges in Implementation

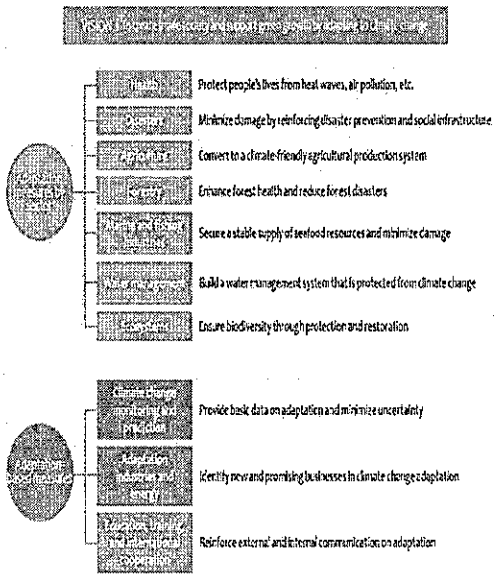


Support for Establishing the NCCAMP

Korea Environment Institute

National Climate Change Adaptation Master Plan ('11~'15)

- The 1st National Climate Change Adaptation Masterplan('10.12)
  - (Period) 2011 ~ 2015
  - (Characteristics) As comprehensive national adaption plan, vision and direction of the national adaptation policy is suggested.
  - (System) 2 areas, 10 sectors, 87 measures
  - (Participated Ministries) 13 Ministries including Ministry of Environment
- Revision of the 1st Plan ('12.12)
  - Outcomes of RCP Scenario applied
  - 9 areas, 67 measures

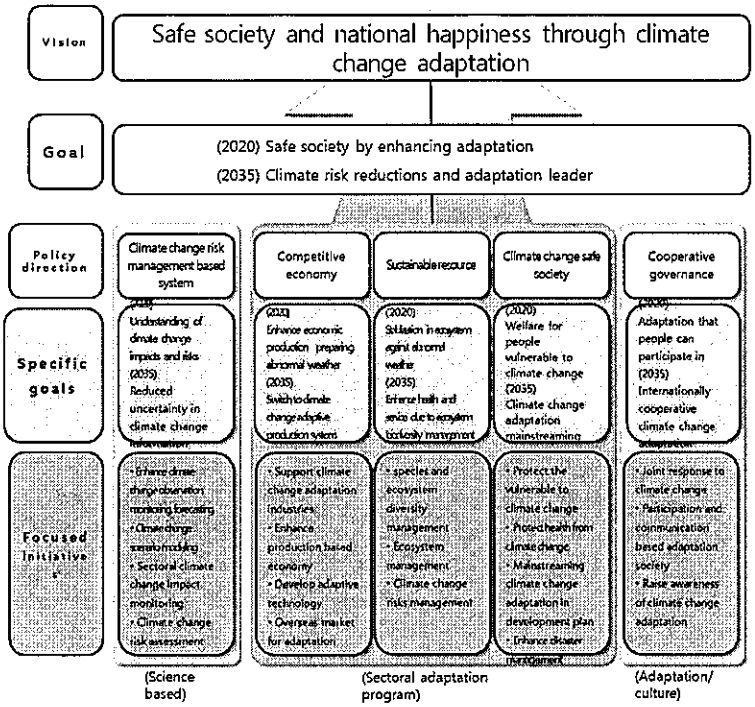


(Resource: related ministries, 2010)

Support for Establishing the NCCAMP

2nd Adaptation Plan ('16 ~ '20)

- (Vision)
  - Safe society and national happiness through climate change adaptation
- (Goal)
  - 5 years short term, 20 years medium-long term
- (System)
  - 2+3 system
  - 5 direction·Specific goals, 20 specific projects

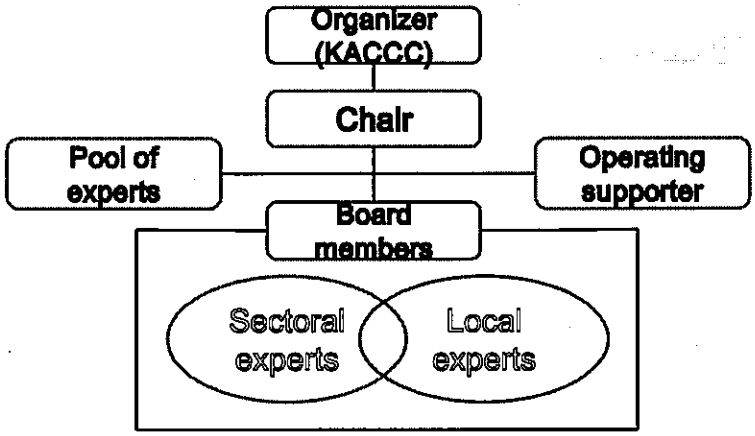


Support for metropolitan and provincial level CCA

- Support to establish and to operate CCA action plans in the metropolitan city(7) and provincial(9) level
  - Help to organize and run the efficient support system for establishment and operation of the action plan
  - Provide training and host workshops to strengthen adaptation capacity of municipal governments
  - Conduct VA and provide the results to prepare action plans

Support for Local (community) Level CCA

1. Help to conduct vulnerability assessments and support the establishment and operation of CCA action plans at local level
2. Provide the results of VA to prepare the action plan in the trial regions
3. Help to organize the advisory board

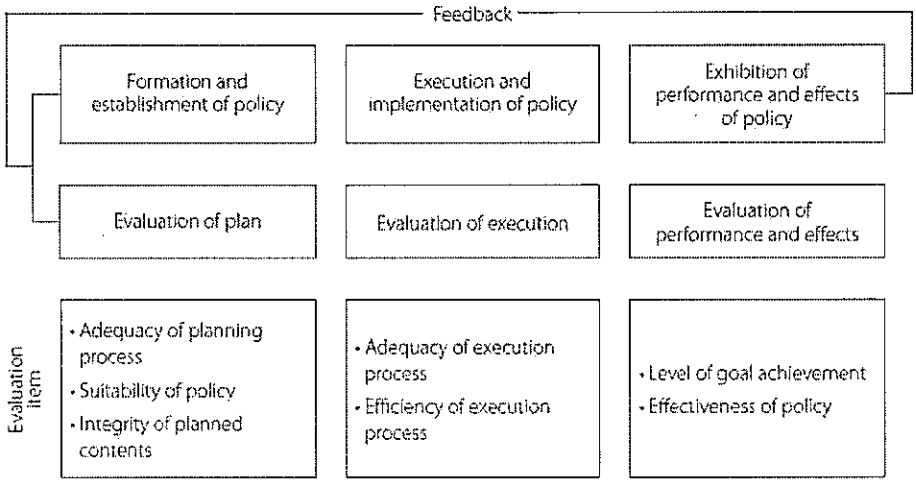


[Organization of the advisory board to support local governments]

Support for Local (community) Level CCA

- Systematize policy management and mainstream adaptation policies
- Monitoring and evaluation of adaptation policies
  - Build inventories of policies for monitoring
  - Suggest evaluation items for each stage of policy

> Evaluation items for each stage of policy

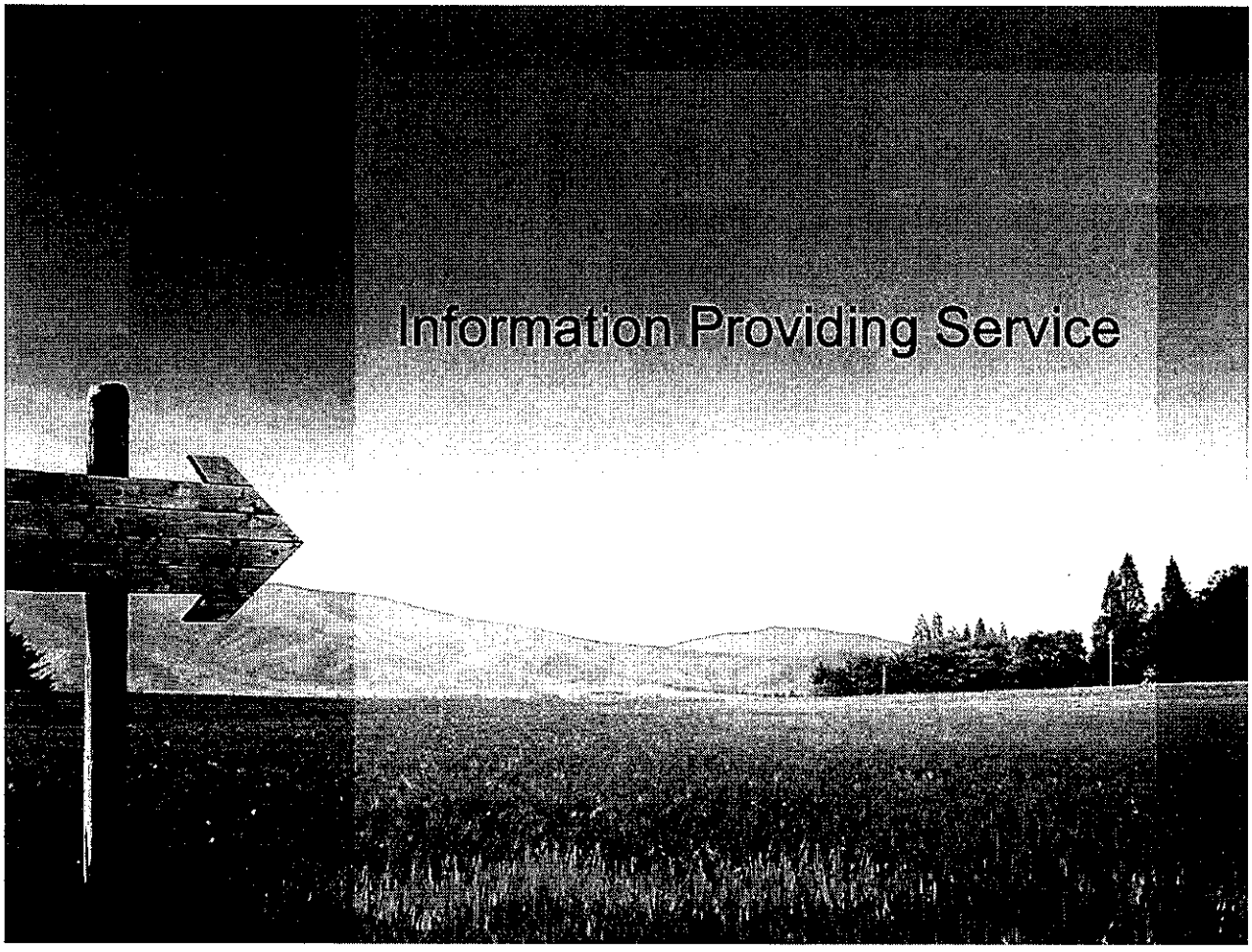


Support for Local (community) Level CCA

Korea Environment Institute

- Local Level
  - From 2012 to 2013, selected 35 local governments were required to formulate detailed implementation plans on climate change adaptation, and expected to extend 193 local governments by the end of 2015.

1. Main Outline of Scheme
2. Analysis on Status of Climate Change
3. Climate Change Outlook and Analysis
4. Climate Change Adaptation Policies and Policy Direction
5. Detailed Climate Change Plan by Sectors - Health - Disaster - Agriculture - Forest - Ecosystem - Water Management - Coast/Fishery - Adaptation bases (Public Relations, Education, and International Cooperation/Adaptation Industry, Energy/Climate Change Monitoring and Prediction)



Supporting system

Korea Environment Institute

❖ Develop a supporting system for providing information

- Provide a supporting system for web-based adaptation policies and inventory search service
- Open wizard pages for adaptation to support the establishment of the adaptation policies

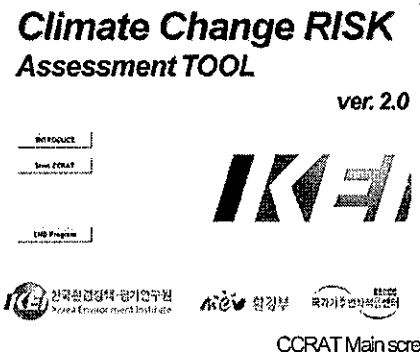
Supporting System for Climate Change Adaptation Policy (http://adapt.kei.re.kr)

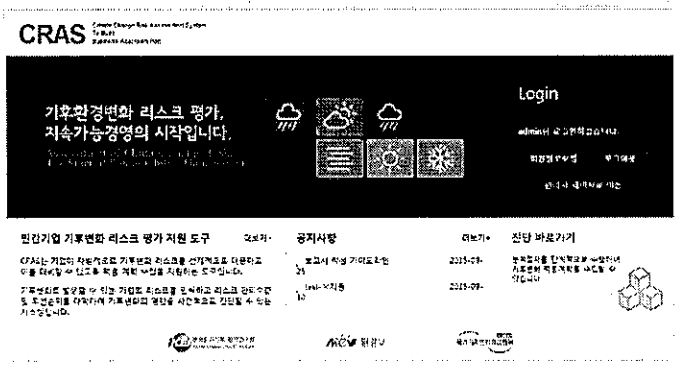
Supporting system

Korea Environment Institute

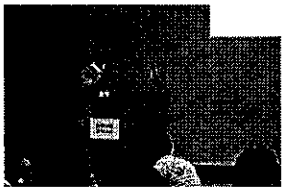
Climate Change Risk Assessment Tool (CCRAT)

- To evaluate how ready a business is to climate change risks
- To check businesses' potential climate change risks (measures in terms of money)
- Can be used in the corporate sustainability management report as a Global Report Initiative 4 guideline





CCRAT Main screen



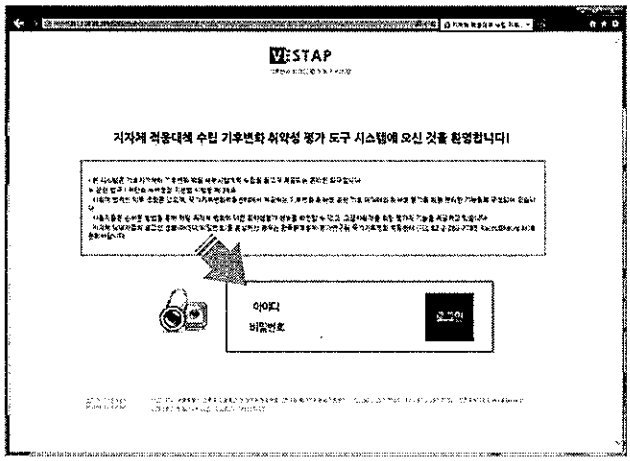
http://cras.kei.re.kr

Supporting system

Vulnerability Assessment tool to Build Climate Change Adaption Plan (VESTAP)

- To help municipal governments to assess vulnerability
- To provide useful information which can be used as spatial-temporal geographic information
- Consist of data on exposure, sensitivity, adaptation capacity and assessment system
  - 2,725 vulnerability indexes classified by health, disaster, agriculture, forest, ocean, water management, ecosystem, observation/projection

< Main screen of VESTAP>



http://vestap.kei.re.kr

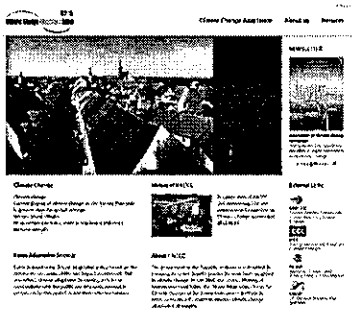
Homepage

❖ Construct PR homepage and renew Climate Change Adaptation Portal (Korean/English)

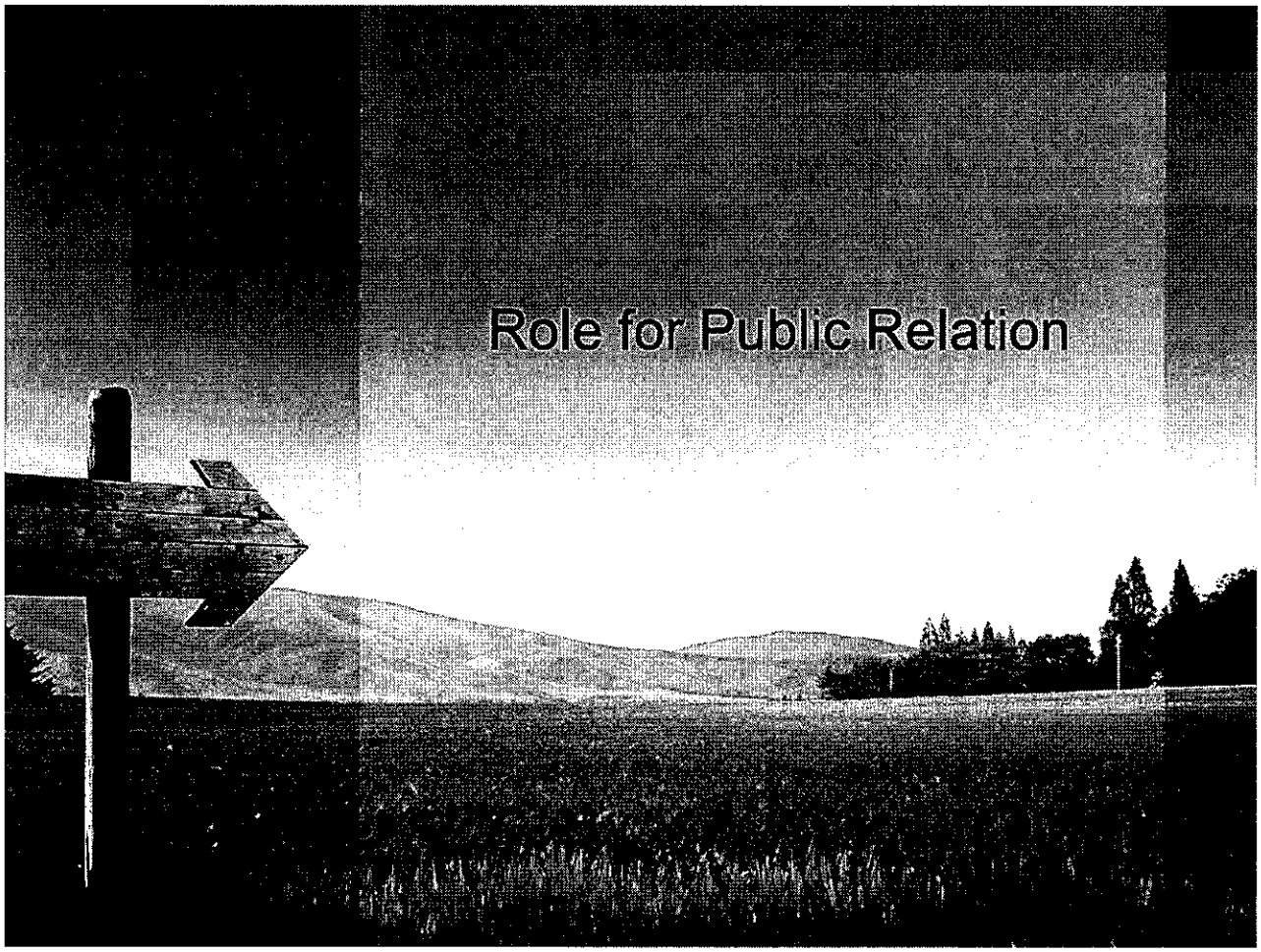
- Construc KACCC homepage in 2009
- Renew it in 2010
- Construct a portal of climate change adaptation in Korean/English in 2011

❖ Build Climate Change Adaptation System

- Build a pilot site for the information delivery system in 2010
- Build "Climate Change Adaptation Intelligence System" in 2011



Climate Change Adaptation System in 2011
(http://ccas.kei.re.kr)



Newsletter

Korea Environment Institute

KACCC Korea Adaptation Center for Climate Change

❖ Publicize and distribute of newsletter (Korean/English)

- Spread the achievement on domestic adaptation policies and reinforce global status by publishing English version of newsletter each quarter

- Contribute to the improvement of awareness and understanding of climate change adaptation through the publication of newsletter

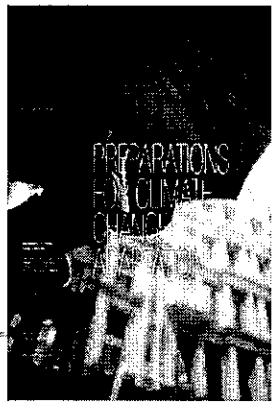
PR publication

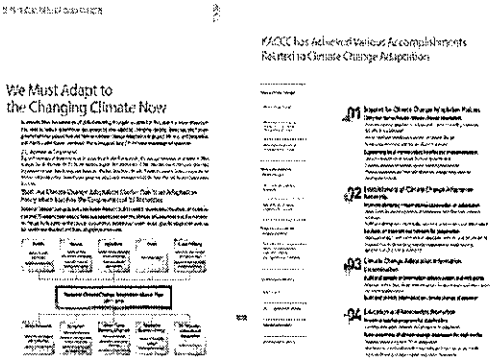
Korea Environment Institute

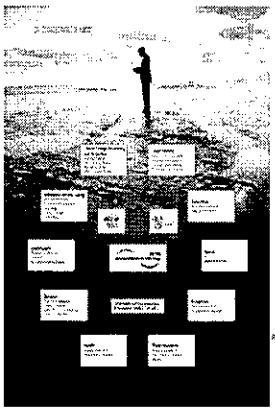
❖ Produce and distribute of adaptation PR materials

- Select core adaptation information, compress the information, and enhance the attention through differentiated edit style and design

- Expand PR contacts for the information on climate change adaptation using various distribution channels such as academic events, international meetings, and field PR with the produced PR materials







Media PR

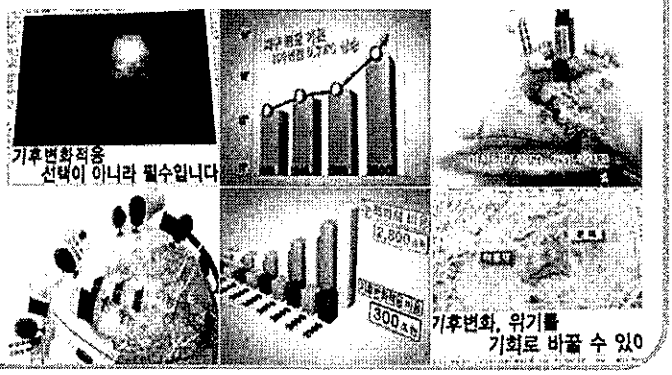
Korea Environment Institute

❖ Develop various media and publicize information

- Plan media coverage considering the joint reporting about overseas adaptation examples and timeliness together with influential major media

- Find various contact media and execute global scale PR considering the changing media environment, and try to make the issues related to climate change adaptation as the common agenda of the society

A video on cases of climate change adaptation in Australia



A video clip on the need of climate change adaption, published on the public space in 2011

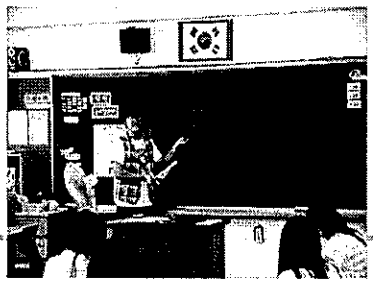
Supporters

Korea Environment Institute

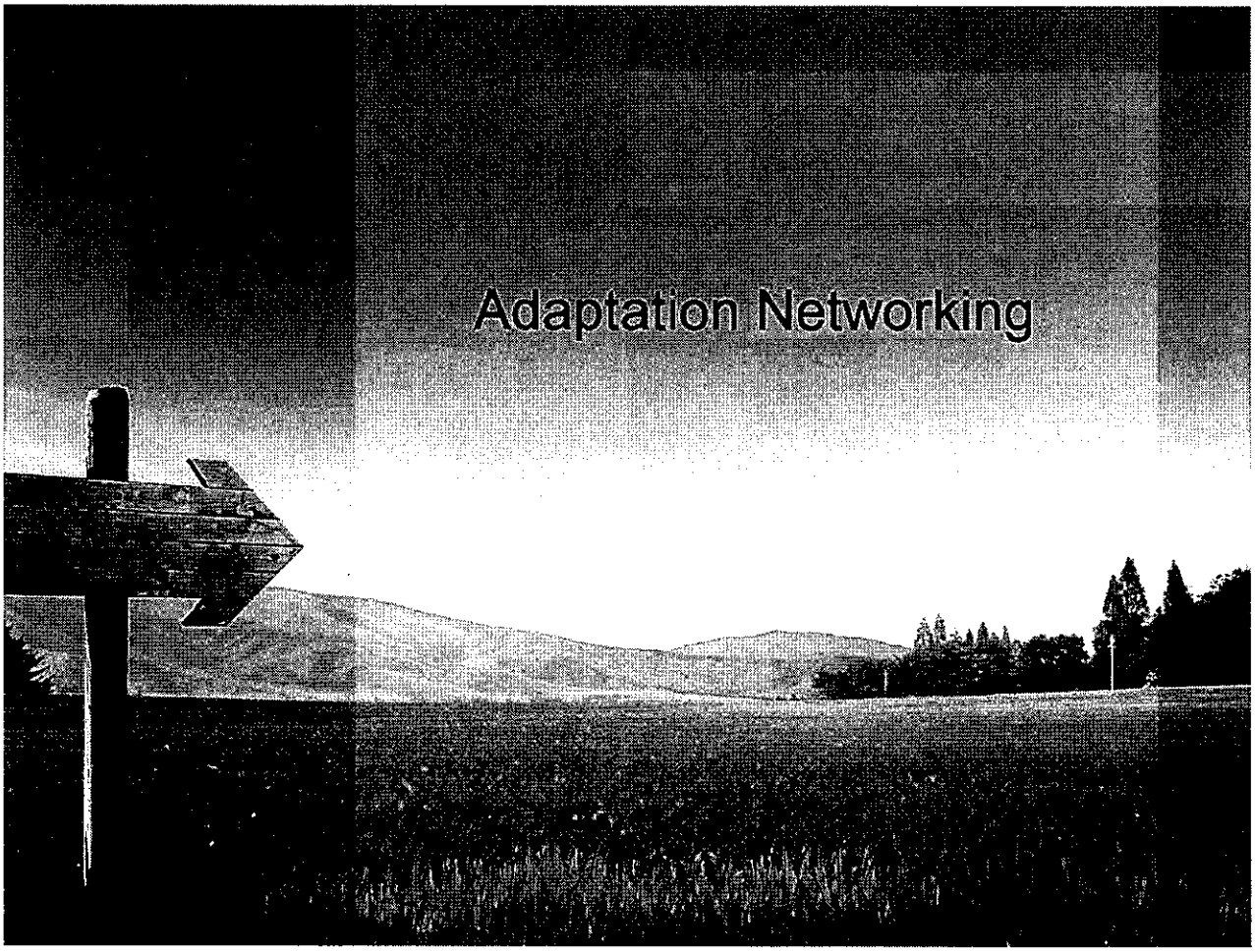
KACCC Korea Adaptation Center for Climate Change

❖ Operate Climate Change Adaptation Supporters

- Develop training materials that are specifically customized to climate change adaptation using various ideas and teaching methods
- Improve the response on education and concentration level through customized classrooms with help of supporters
- Contribute to the improvement of necessity and understanding of climate change adaptation through the education as suggested by the results of satisfaction level survey



KACCC's Activities on International Collaboration



Domestic Networking

Korea Environment Institute

Korea Adaptation Center for Climate Change

1. Expand network and reinforce collaboration with organizations in Korea

❖ Reinforce the collaboration with related organizations in Korea

- Sign MOU with related organizations and prepare foundation to reinforce partnerships

❖ Share research results on climate change adaptation

- Hosted workshop for sharing achievements on adaptation researches
- Publish research source book about climate change adaptation by area jointly with collaboration organizations (2011)

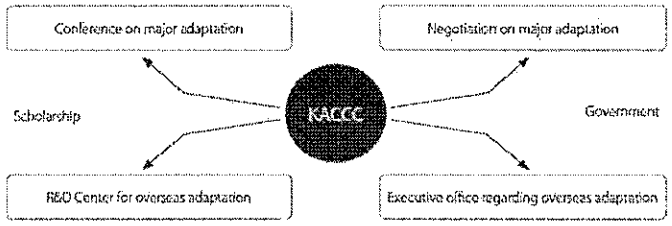
International Networking

2. Built international network of adaptation and support Korean government for international negotiation

❖ Establish international adaptation network and support Korean government for international negotiation

- Support international government level negotiation related to adaptation
- Sign MOUs with overseas organizations related to adaptation
- Visit, invite, interview and execute collaboration with overseas organizations related to adaptation
- Participated major international meetings related to adaptation

> Concept diagram of international network of KACCC

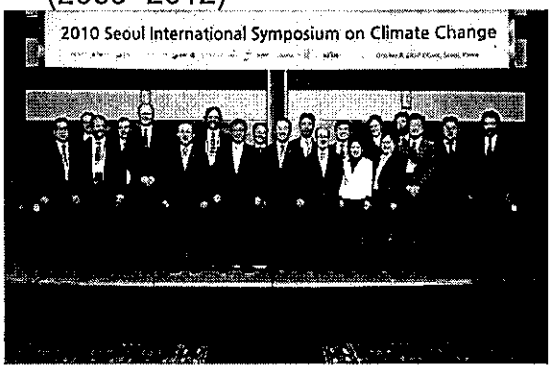


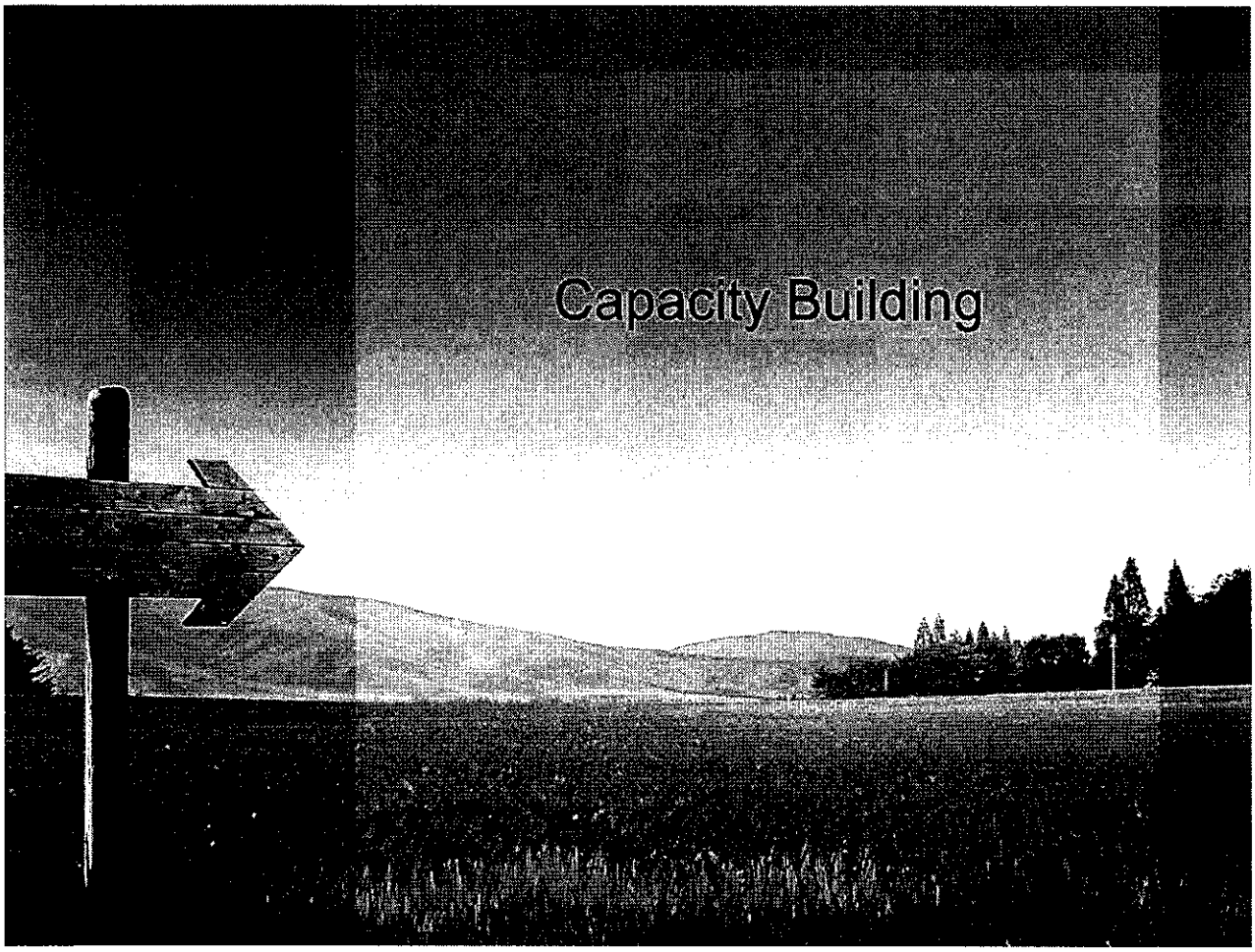
International Collaboration

3. Facilitate international collaboration for capacity building

❖ Review the current international adaptation discussions and host international symposium

- Examine latest trends of adaptation(document survey)
- Hosted international symposium about climate change adaptation (2009~2012)





1. Support adaptation policy and capacity building for adaptation in Korea

Korea Environment Institute

❖ Train local government officials and run expert forums

- Support adaptation policies and reinforce capacities through experts' forum on climate change adaptation

- Reinforce capacities of people in charge of adaptation in municipal governments adaptation through the training related to the establishment of Master Plan

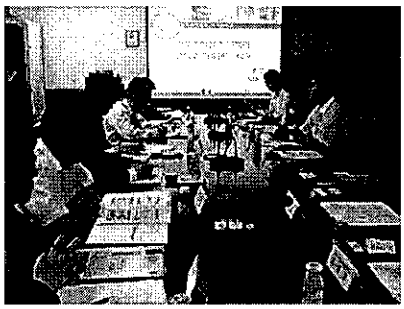
Expert forum

the training related to the establishment of Master Plan

2. Reinforce capacity for industries on climate change adaptation

Korea Environment Institute

- Improved the awareness of climate change adaptation in the private sector and revitalized the execution of adaptation plan for industries
  - Hosted forums for finding new industries and promising industries regarding the adaptation to the climate change (2011)
  - Hosted workshop to improve the capacities of climate change adaptation for the industries (2012).



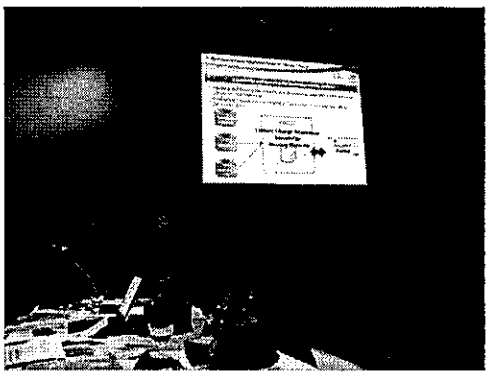
forum

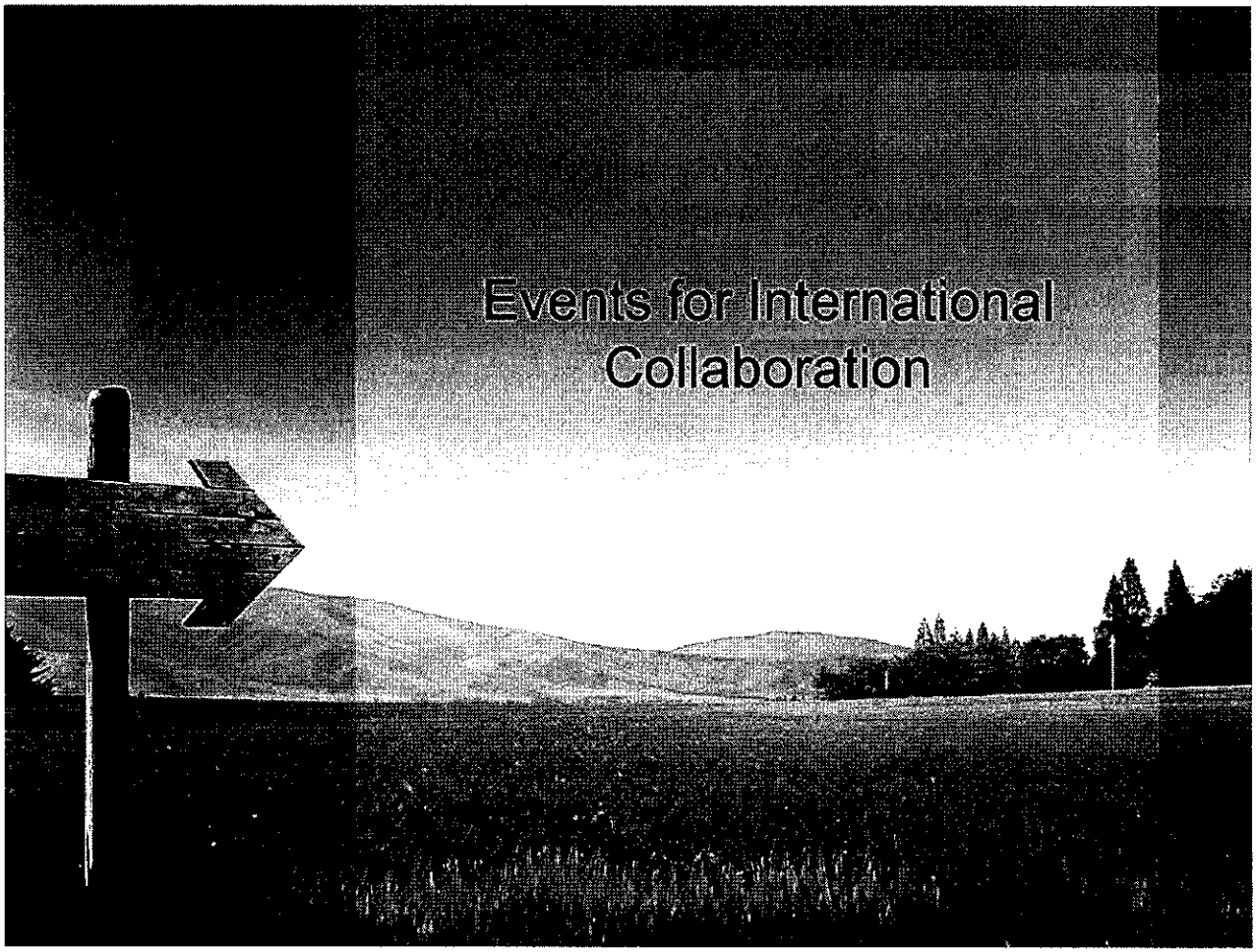
workshop

3. Support reinforcement of adaptation capacities of underdeveloped countries

Korea Environment Institute

- Train government officials in ASEAN on climate change adaptation
  - Establish adaptation network with ASEAN region and secure global leadership by training government officials in ASEAN on climate change adaptation(2010~2011)





International Symposium

Korea Environment Institute

KACCC Korea Adaptation Center for Climate Change

(1) International Symposium on Climate Change Adaptation

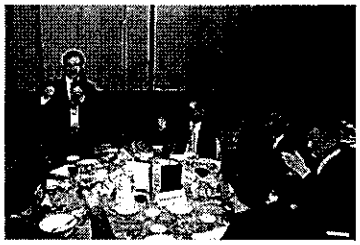
	
2009 The 1st International Symposium on Climate Change Adaptation Strategies for Asia and the Pacific Region	2010 The 2nd International Symposium on Climate Change Adaptation
	
2011 The 3rd International Symposium on Climate Change Adaptation	2012 The 4th International Symposium on Climate Change Adaptation

2013 APAN Forum

(1) International Symposium on Climate Change Adaptation

Asia-Pacific Climate Change Adaptation Forum
18-20 March 2013, Incheon, Republic of Korea

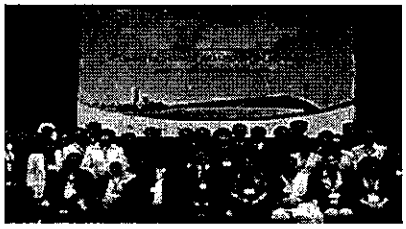
- ❍ Participants: 500
- ❍ Host Organization: Korea Environment Institute (KEI)
- ❍ Co-organizers:
  - United Nations Environment Programme (UNEP)
  - Institute for Global Environment Strategies (IGES)
  - Regional Resource Centre for Asia and the Pacific (RRC.AP)
  - Stockholm Environment Institute (SEI)
- ❍ Sponsors:
  - Ministry of Environment, Korea
  - Ministry of the Environment, Japan
  - Asian Development Bank
  - Incheon Metropolitan City
  - Korean International Cooperation Agency(KOICA)



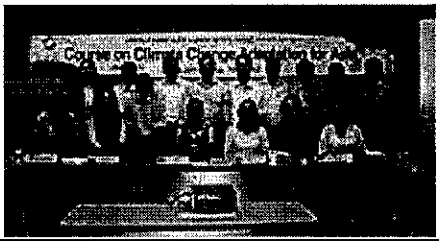
Capacity Building

(2) Capacity Building Program

2010. International Workshop on Climate Change, Phuket, Thailand



2011. Regional Training on Cross-Sectoral Climate Change Adaptation Planning, Bangkok, Thailand



2012. Course on Climate Change Adaptation for Asia, Seoul, Republic of Korea

2012. Training on Capacity Building to develop Climate Change Response towards Green Growth, Ho Chi Minh, Vietnam

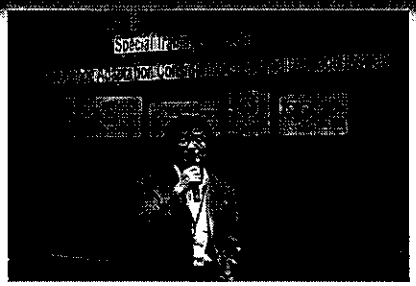
2013 Capacity Building

Korea Environment Institute

(2) Capacity Building Program

Climate Change Adaptation Considering Loss and Damage Issues (Special Training Program)

- O Dates : 29-31 August 2013
- O Venue : Bangkok, Thailand
- O Co-organizers:
  - Climate Change Cooperation Division, Ministry of Environment(MOE), Korea
  - Korea Adaptation Center for Climate Change (KACCC)
  - Korea Environment Institute (KEI)
  - United Nations Environment Programme (UNEP)
  - Asia Pacific Adaptation Network(APAN)
- O Target Participants
  - Researchers, specialists and public officials working on climate change adaptation and loss and damages issues

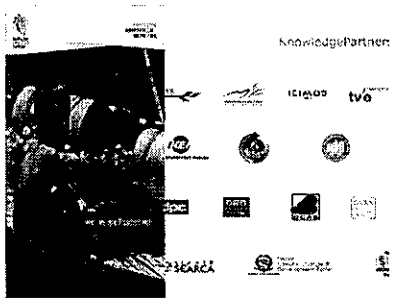


International Adaptation Network

Korea Environment Institute

(3) International Adaptation Network

Support for Government Delegations at International Discussions (2009-2013)	Building Partnership with IGOs and Other Adaptation Institutions (2009-2012)	Asia Pacific Adaptation Network (APAN) Participation (2009-2013)
• Send delegations to international discussions such as IPCC, UNFCCC	• Participate major adaptation-related international events • Promote cooperation with IGOs and other adaptation institutions	• Attendance of Adaptation related committee and meetings • Co-host Forums and training Program



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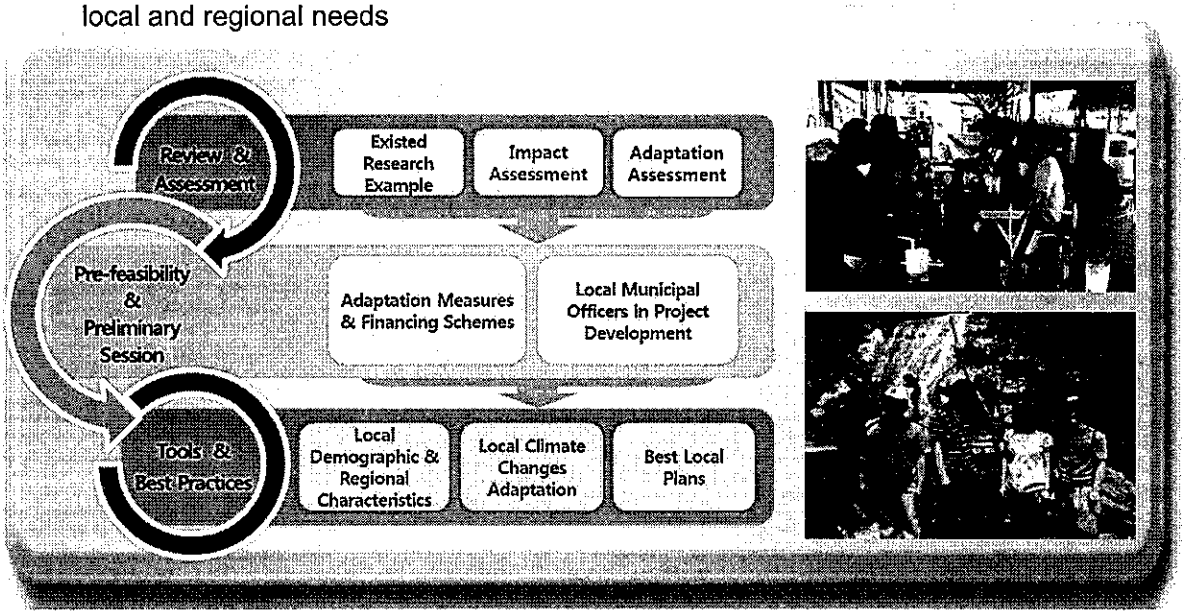
(4) International Cooperation Project : Philippine eco-town project

❖ Demonstration of Eco-town Framework in the Municipality of San Vicente Palawan, Philippines
- Provide the local strategy on the climate change adaptation plan with respect to local and regional needs



Korea Environment Institute

Thank You!

Development of Climate Change Risk Assessment Tool(CCRAT) for Business Sector

Dong Hyun Kim
(donghyunkim@kei.re.kr)

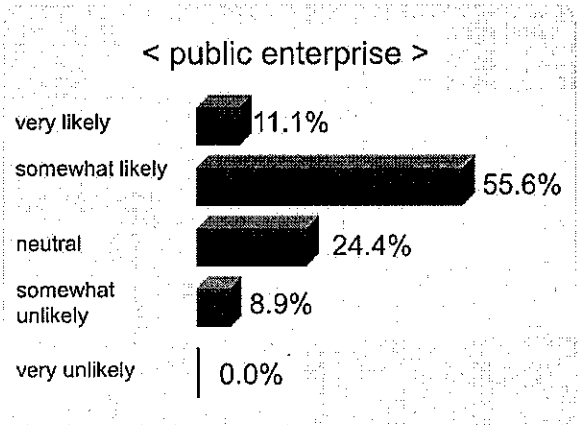
Korea Adaptation Center for Climate Change
Korea Environment Institute

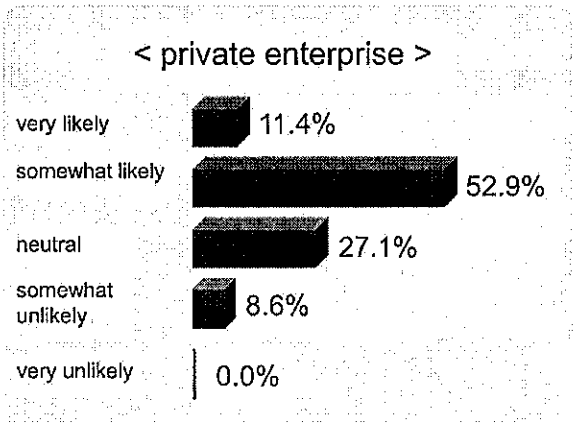
Contents

Ⅰ. Research background

1. Needs of business sector

- **Survey on climate risk perception of business sector in Korea(KEI, 2012)**
  - likelihood of climate risk impact on their business

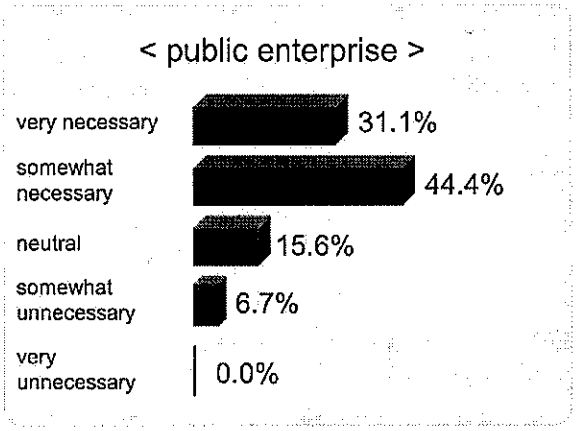


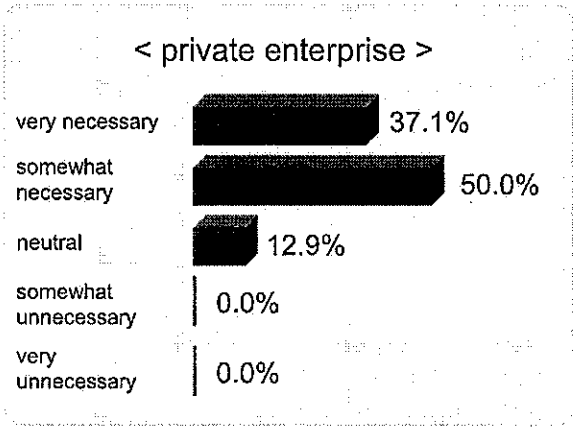


Ⅰ. Research background

1. Needs of business sector

- **Survey on climate risk perception of business sector in Korea(KEI, 2012)**
  - necessity for mitigating expected damage of climate risk

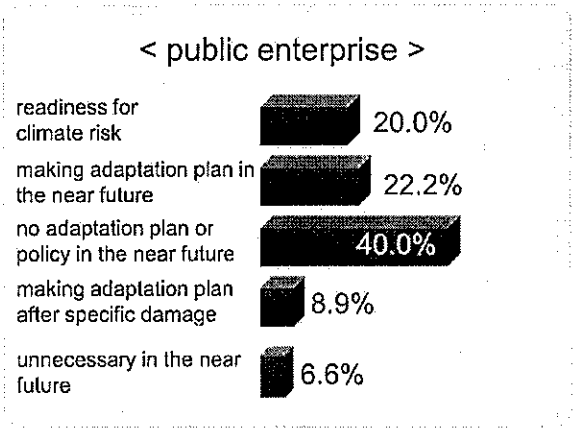


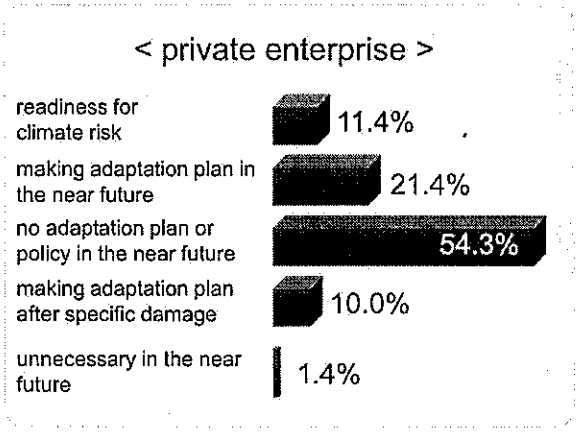


Ⅰ. Research background

1. Needs of business sector

- **Survey on climate risk perception of business sector in Korea(KEI, 2012)**
  - readiness through adaptation policy and risk management plan

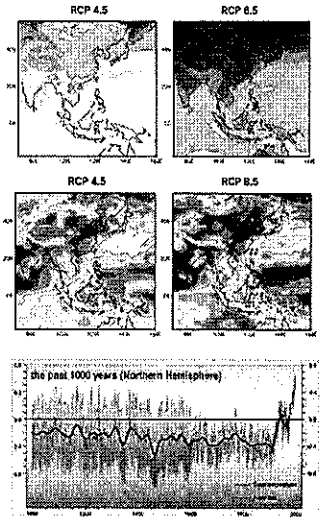




Ⅰ. Research background

2. Gaps between science and business in climate change

- **Why do they not start making adaptation plan now?**
  - inadequate information to business sector : uncertain and difficult
  - no implication to CEO: nonfinancial perspective and cost-centered mechanism
  - unconcern about some phenomenon in the 2100 year
- **Climate change adaptation in business sector**
  - not scientific problem but adequately mainstreaming problem

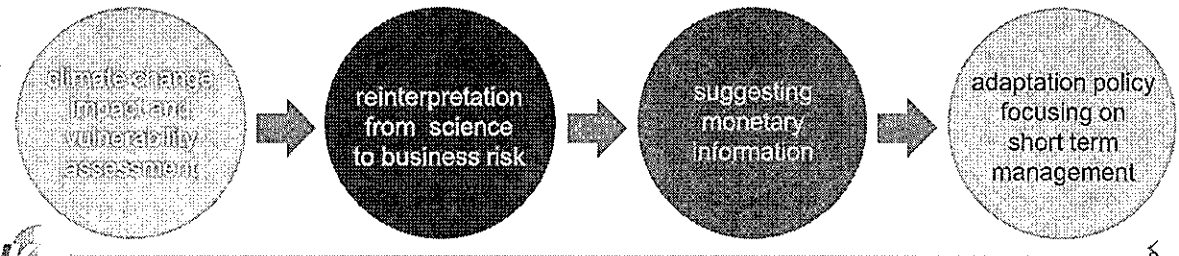


<typically useless information in business sector for climate change adaptation>

Ⅰ. Research background

2. Gaps between science and business in climate change

- **Reducing the gap between science and business perspective**
  - scientific numbers and climate modeling results → understandable and user-friendly risk explanation
  - difficult and uncertain information → monetary information
  - long-term forecasting → short-term forecasting
  - ambiguous, focusless, and comprehensive adaptation policy → strategic and safety-centered policy



Ⅰ. Research background

3. Research Purposes

- **making the climate risk assessment tool and suggesting adequate information for business sector**

  ① making the climate risk assessment tool using semi-quantified risk analysis

  ② providing the guideline for adaptation policy in business sector

  ③ suggesting the information and educating the adaptation plan making process using participatory planning process

Ⅰ. Research background

4. Research Methods

- **systematic climate risk classification**
  - five abnormal weather event of climate change
  - three possible damage behavioral factor of business sector
    - input factors for production(labor, capital), selling, management

- **semi-quantified risk assessment using probability and checklist**
  - socially observed damage patterns related weather event using text-mining method
  - estimating posterior probability using Bayesian statistical approach
  - making education program using participatory planning method

I

II Development of CCRAT

III

IV

Ⅱ. Development of CCRAT

1. Principles of development

- **Principle 1 : user friendly**
  - transforming climate change impact to descriptive risk relating business operation and market

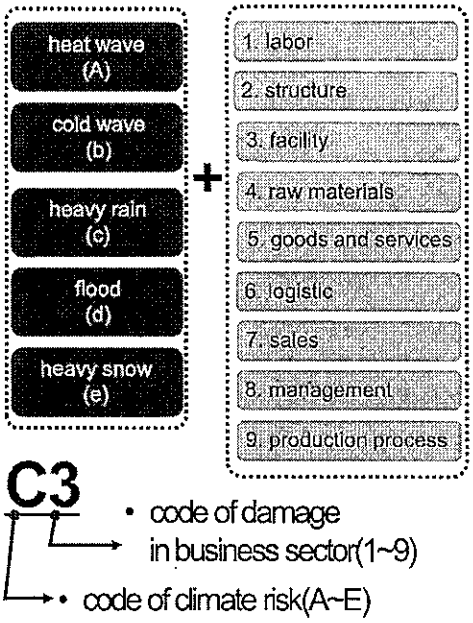
- **Principle 2 : appropriate information**
  - suggesting the monetary and financial outcome as the climate risk assessment

- **Principle 3 : general application**
  - enabling any company to use the risk assessment process

Ⅱ. Development of CCRAT

2. Structures of CCRAT

- **Systematic classification of climate risk in business sector**
  - five abnormal or extreme weather event : heat wave, cold wave, heavy rain, flood, heavy snow
  - specifying three possible damage behavioral factors to nine factors
    - labor, structure, facility, raw materials, goods and services, logistic, sales, management, and production process



Ⅱ. Development of CCRAT

2. Structures of CCRAT

- **Checklist for climate risk assessment**
  - eight items for readiness about selected climate risk
  - transforming outcome of checklist to numeric form

- **Semi-quantified risk assessment**
  - outcome of subjective assessment from checklist → constructing the base of estimating conditional posterior probability
  - prior probability distribution → frequency of socially observed damage
  - climate risk probability → regional climate projection database by Korea Meteorological Administration (2012)

Ⅱ. Development of CCRAT

2. Structures of CCRAT

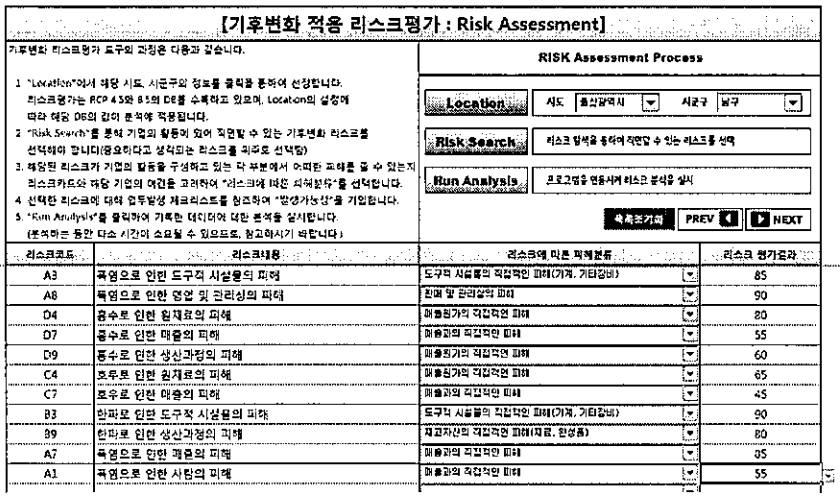
- **DB for calculating possible future damage**
  - a statement of profit and loss
  - financial statements
  - inputting six financial factors : tangible assets(structure, facility), sales, inventory asset, sales cost, selling and administrative expense

- **Four Korea economic growth scenarios**
  - high growth (2% growth a year)
  - average growth (1% growth a year)
  - low growth (-0.5% growth a year)
  - no change (base scenario)

Ⅱ. Development of CCRAT

3. Functions of CCRAT

- **Climate risk assessment**
  - Risk selection and inputting the outcome of checklist


[기후변화 적응 리스크평가 : Risk Assessment]

기후변화 리스크평가 도구의 과정은 다음과 같습니다.

1. "Location"에서 해당 시도, 시군구의 정보를 클릭을 통하여 선정합니다.
   리스크평가는 RCP 4.5와 8.5의 DB를 수록하고 있으며, Location의 설정에 따라 해당 DB의 값이 분석에 적용됩니다.
2. "Risk Search"를 통해 기업의 활동에 있어 직면할 수 있는 기후변화 리스크를 선택해야 합니다(중요하다고 생각되는 리스크를 최우선 선택함)
3. 해당된 리스크가 기업의 활동을 구성하고 있는 각 부분에서 어떠한 피해를 줄 수 있는지 리스크카드와 해당 기업의 여건을 고려하여 "리스크에 따른 피해분류"를 선택합니다.
4. 선택한 리스크에 대해 업무발생 체크리스트를 참조하여 "발생가능성"을 기입합니다.
5. "Run Analysis"를 클릭하여 기록한 데이터에 대한 분석을 실시합니다.
   (분석하는 동안 다소 시간이 소요될 수 있으므로, 참고하시기 바랍니다.)

RISK Assessment Process

Location — 시도: 울산광역시 시군구: 남구

Risk Search — 리스크 탐색을 통하여 직면할 수 있는 리스크를 선택

Run Analysis — 프로그램을 연동시켜 리스크 분석을 실시

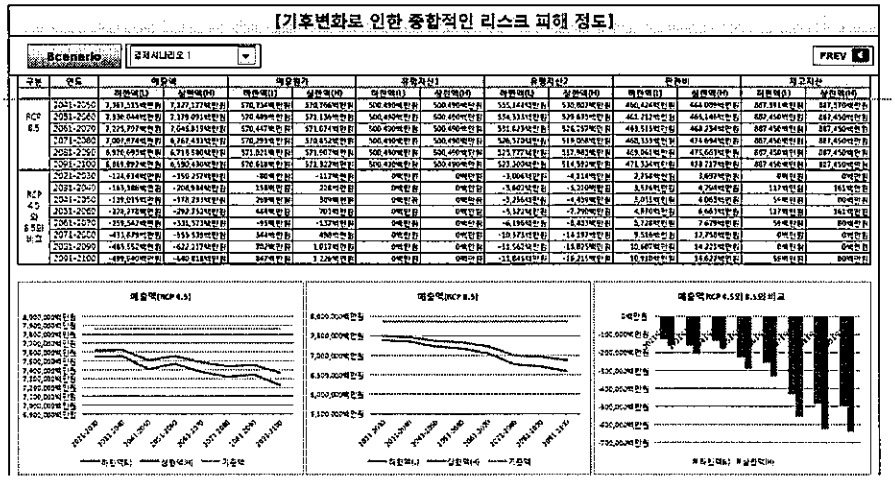
엑셀로기록 PREV NEXT

리스크코드	리스크내용	리스크에 따른 피해분류	리스크 평가결과
A3	폭염으로 인한 도구적 시설물의 피해	도구적 시설물의 직접적인 피해(기계, 기타장비)	85
A8	폭염으로 인한 영업 및 관리상의 피해	판매 및 관리상의 피해	90
D4	홍수로 인한 원재료의 피해	매출원가의 직접적인 피해	80
D7	홍수로 인한 매출의 피해	매출과의 직접적인 피해	55
D9	홍수로 인한 생산과정의 피해	매출원가의 직접적인 피해	60
C4	호우로 인한 원재료의 피해	매출원가의 직접적인 피해	65
C7	호우로 인한 매출의 피해	매출과의 직접적인 피해	45
B3	한파로 인한 도구적 시설물의 피해	도구적 시설물의 직접적인 피해(기계, 기타장비)	90
B9	한파로 인한 생산과정의 피해	재고자산의 직접적인 피해(재료, 완성품)	80
A7	폭염으로 인한 매출의 피해	매출과의 직접적인 피해	85
A1	폭염으로 인한 사람의 피해	매출과의 직접적인 피해	55

Ⅱ. Development of CCRAT

3. Functions of CCRAT

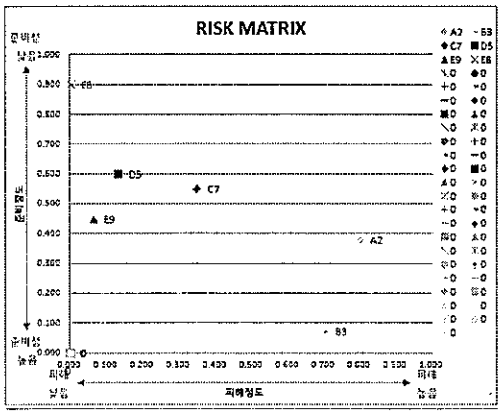
- **Climate risk assessment**
  - estimating the future damage as financial factor and RCP scenario(4.5/8.5)

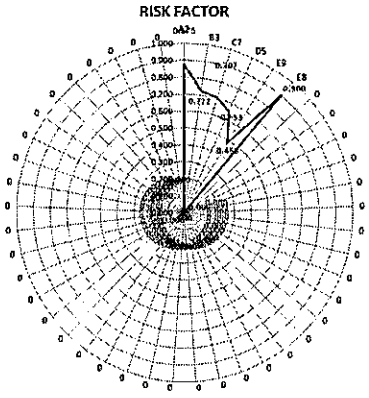


Ⅱ. Development of CCRAT

3. Functions of CCRAT

- **Climate risk assessment**
  - showing the risk matrix and risk factor for risk management priority

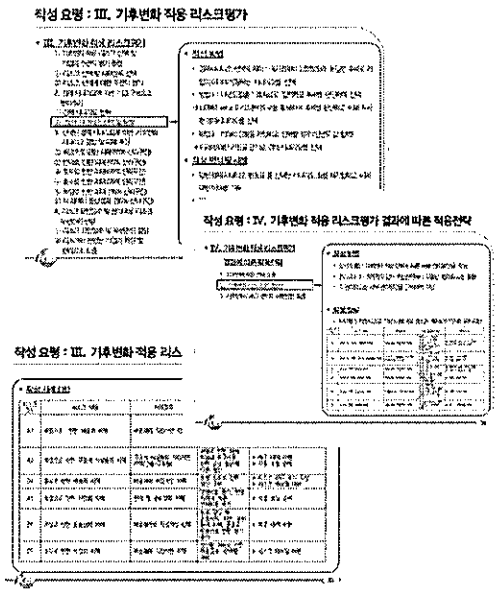




Ⅱ. Development of CCRAT

4. Adaptation plan guideline for business sector

- **Plan guideline for climate risk management and adaptation**
  - suggesting the guidelines to manage climate risk shortly
  - the methods to make management plan for climate adaptation
  - examples and form of plan
  - purposes, risk assessment, adaptation strategy, and implementation policy

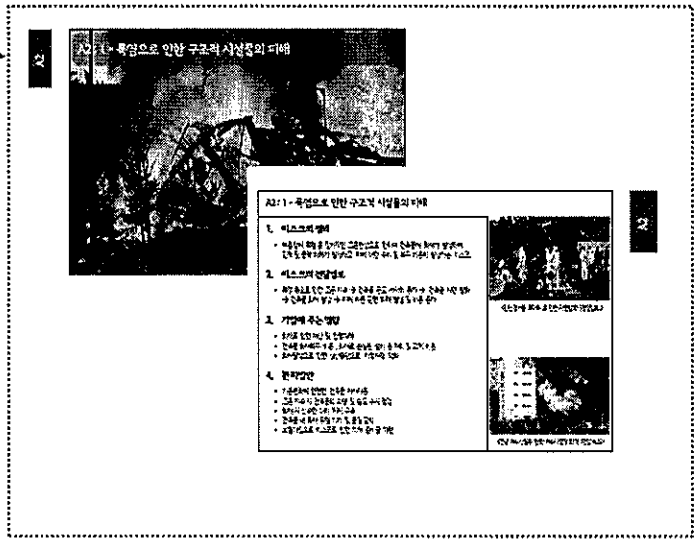


Ⅱ. Development of CCRAT

5. Five steps of risk assessment and developed tools

- **Step 1 : risk screening → climate risk card**

Step 1	Risk screening
Step 2	Risk selection
Step 3	Risk assessment
Step 4	Damage estimation as risk assessment
Step 5	Making risk management policy

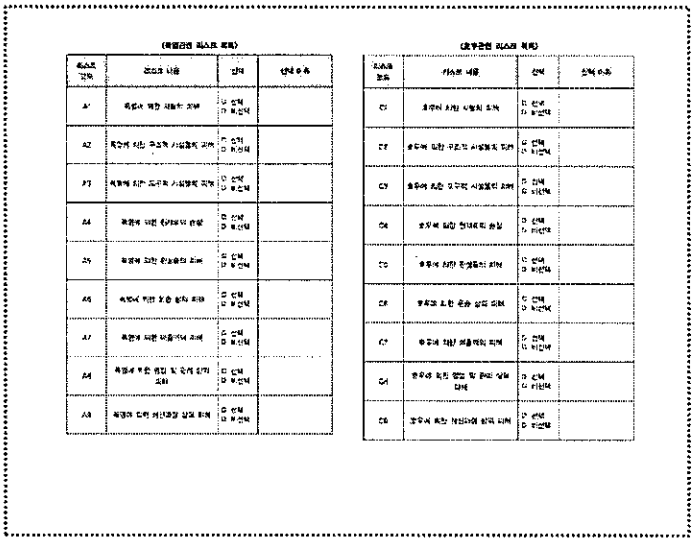


Ⅱ. Development of CCRAT

5. Five steps of risk assessment and developed tools

- **Step 2 : risk selection → climate risk list sheet**

Step 1 Risk screening
Step 2 Risk selection
Step 3 Risk assessment
Step 4 Damage estimation as risk assessment
Step 5 Making risk management policy

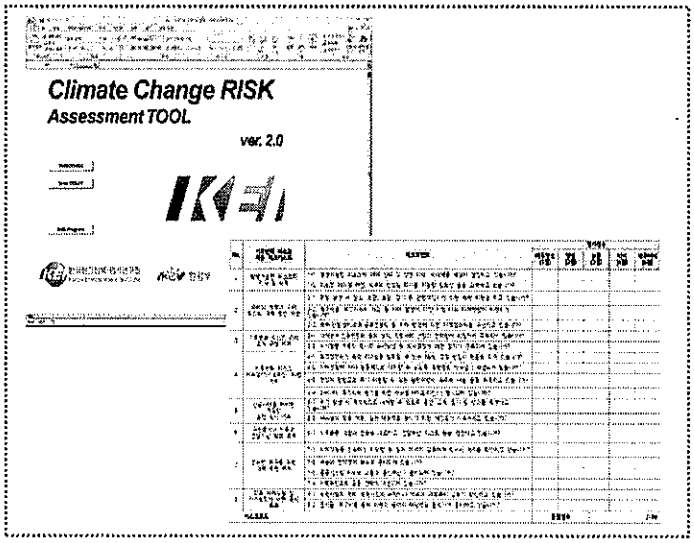


Ⅱ. Development of CCRAT

5. Five steps of risk assessment and developed tools

- **Step 3 : risk assessment → checklist and CCRAT**

Step 1 Risk screening
Step 2 Risk selection
Step 3 Risk assessment
Step 4 Damage estimation as risk assessment
Step 5 Making risk management policy

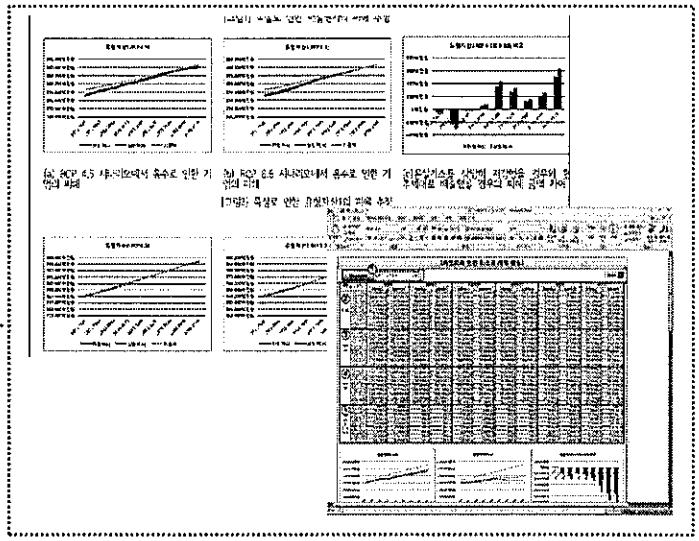


Ⅱ. Development of CCRAT

5. Five steps of risk assessment and developed tools

- **Step 4 : estimation → CCRAT**

Step 1	Risk screening
Step 2	Risk selection
Step 3	Risk assessment
Step 4	Damage estimation as risk assessment
Step 5	Making risk management policy

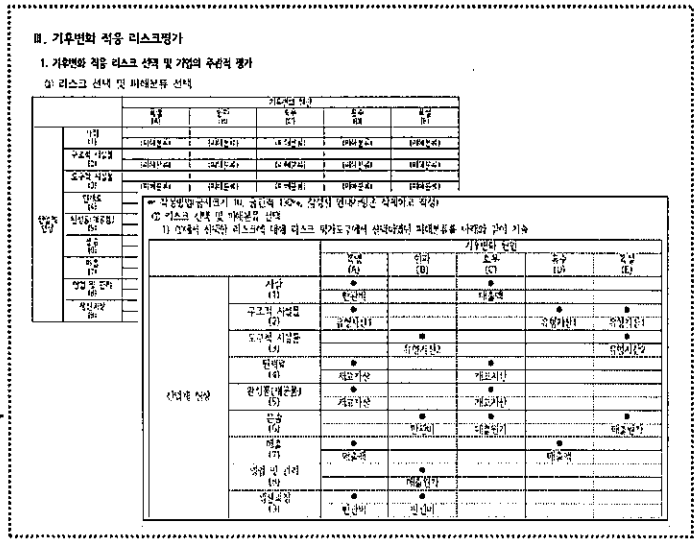


Ⅱ. Development of CCRAT

5. Five steps of risk assessment and developed tools

- **Step 5 : making management policy → adaptation plan guideline**

Step 1	Risk screening
Step 2	Risk selection
Step 3	Risk assessment
Step 4	Damage estimation as risk assessment
Step 5	Making risk management policy



Ⅰ
Ⅱ
Ⅲ 2nd Training program for business sector
Ⅳ

Ⅲ. Training program for business sector

1. Information for climate change adaptation

- **How to provide the information about climate change adaptation**
  - understanding what they want to know
  - focusing the target to mainstream the adaptation
  - providing the information to apply various purposes
  - educating the methods to make the plan and implementation for oneself

Ⅲ. Training program for business sector

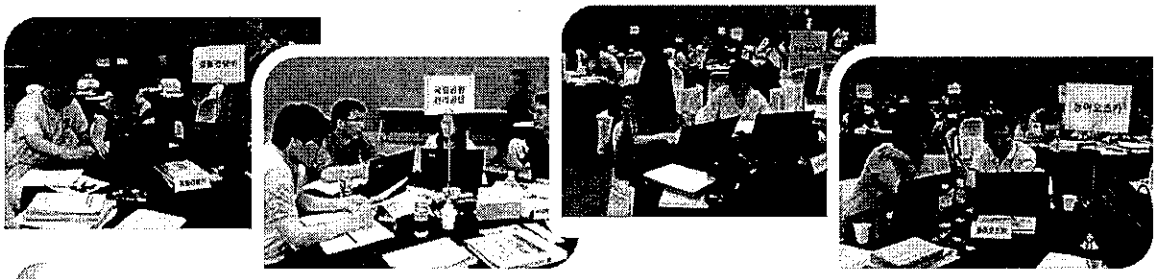
2. Risk management training program for climate change adaptation

- **2nd Risk management training program for climate change adaptation**
  - integrating lecture and practice(20min lecture + 30min practice)
  - suggesting the tools for practice (risk card / notebook / CCRAT / risk selection sheet)
  - total 17.5 hours intensive training(6/25 ~ 6/27)

Ⅲ. Training program for business sector

3. Results of risk management training program

- **Participation of 14 company**
  - private company : Kyung Dong Construction, Daegu Tech, Korail, CJ Construction, AREX, Donga-otsuka
  - public company : Incheon International Airport Corporation, Korean National Park Services, Korea Gas, SUDOKWON Landfill site management corporation, Mine Reclamation corporation, KOSEP, KOSPO, Korea expressway corporation, Korea district heating corporation

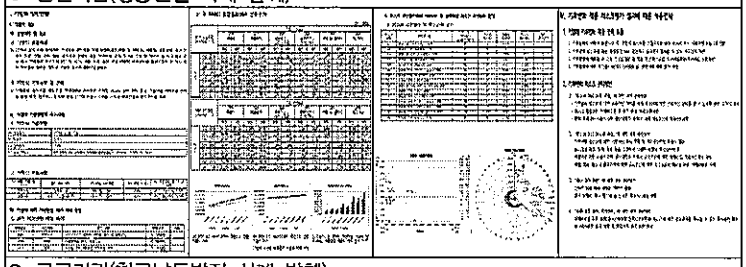


Ⅲ. Training program for business sector

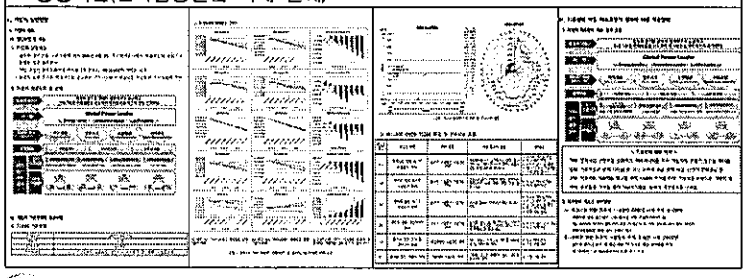
3. Results of risk management training program

- **Participation of 14 company**

○ 민간기업(경동건설 시례 발췌)



○ 공공기관(한국남동발전 시례 발췌)



Ⅳ. Implication

- **Governance for business sector**

- **Change of awareness**
  - Middle manager of company
  - Government official
  - Researcher

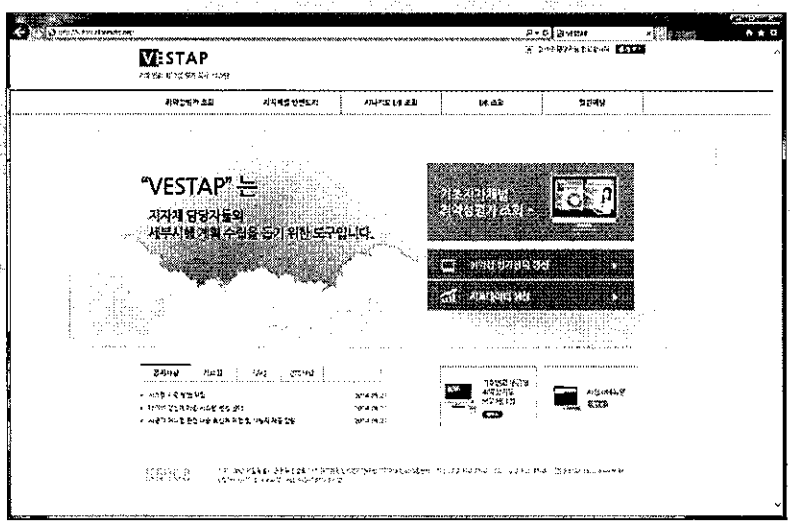
- **Corporate sustainability management**
  - GRI 4 guidelines for adaptation
  - sustainable management for climate change

Thank you

04

VESTAP

Vulnerability Assessment Tool to build Climate Change Adaptation Plan



4. VESTAP

4.1 Instruction

❖ Needs of VESTAP

- Adaptation plan for climate change is needed based on associated information and integrity analysis.
- However, so far, the information of climate change has been administrated or generated by other agency.
- Complexity concerning CCV assessment tool, which was developed before, and reliability has been constantly questioned.
- Accordingly, we developed a web-based Supporting Tool(VESTAP) for climate change vulnerability assessment that can be used by lower and municipal-level local governments.
- The VESTAP has maximized convenience by providing various analytical functions such as spatial distribution, bias and schematization of each vulnerability assessment result.

4. VESTAP

4.2 Method

❖ What is the Climate Change Vulnerability (CCV)?

- IPCC defined CCV as "the degree to which a system is susceptible to and unable to cope with, adverse effects of climate change, including climate variability and extremes"
- CCV is a function of a system's exposure, sensitivity, and adaptive capacity to climate change

Vulnerability Formula

$$\text{Vulnerability} = \alpha \times \text{exposure} + \beta \times \text{sensitivity} - \gamma \times \text{adaptive capacity}$$

(α, β, γ : weighting per variables)

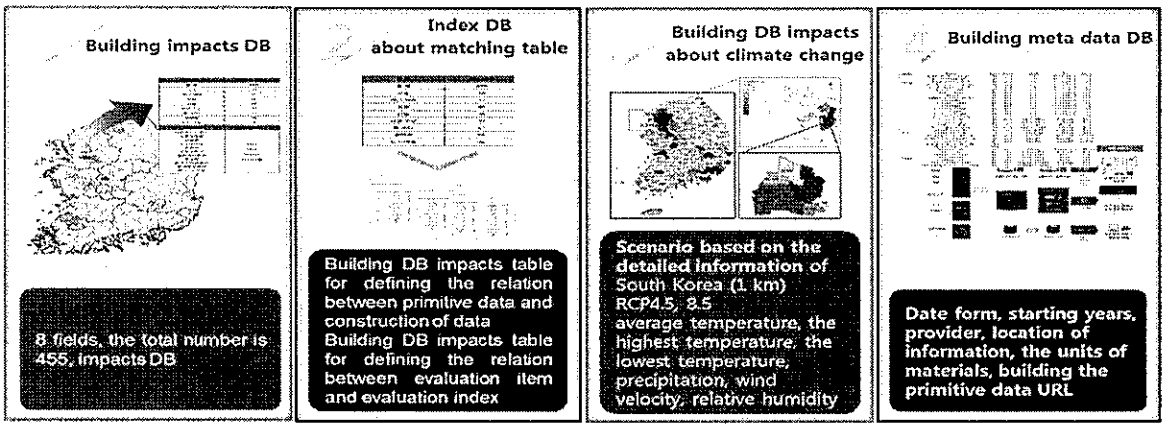
Exposure: Degree of climate stress upon a particular unit analysis
Sensitivity: Degree to which a system will be affected by climate stimuli
Adaptive capacity: the potential or capability of a system to adjust to climate change, including climate variability and extremes

4. VESTAP

4.2 Development

❖ Building impacts DB for CCV assessment

- 620 literatures researched and 51 government organizations interviewed.
- Based on researches and interviews, 2,725 impacts were obtained.
- Among 2,725 impacts, 455 impacts were firstly charge into a database.

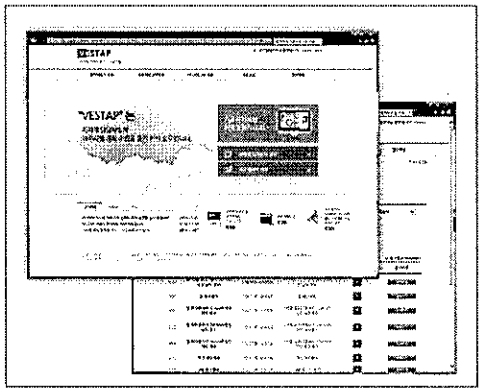


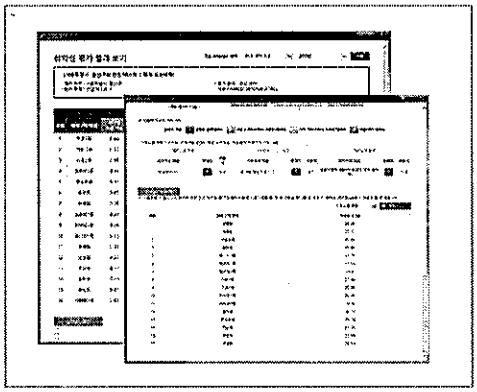
4. VESTAP

4.3 Development

❖ Building CCV assessment tool(VESTAP)

- Design for availability of the internet based on web anytime, anywhere
- Improving users' understanding and satisfaction due to the simple composition of UI
- Providing results about CCV assessment based on scenarios of RCP 4.5, scenario of 8.5, 8 fields, 32items





4. VESTAP

4.2 Development

❖ Building CCV assessment tool(VESTAP)

- Basic Vulnerability Assessment Item List Provided by VESTAP

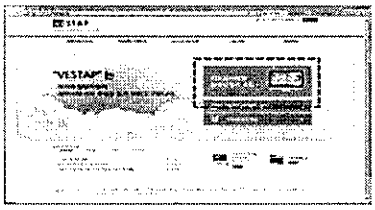
Division	Name of Vulnerability Assessment Item	Division	Name of Vulnerability Assessment Item
Health (9)	Health Vulnerability by Flood	Water Control (3)	Vulnerability in Water Control
	Health Vulnerability by Typhoon		Vulnerability in Irrigation
	Health Vulnerability by Heat Wave		Vulnerability in Water Quality and Aquatic Ecology
	Health Vulnerability by Cold Wave	Ecosystem (3)	Vulnerability of Coniferous Trees
	Health Vulnerability by Increase of Ozone Concentration		Vulnerability of Insects
	Health Vulnerability for Fine Dust		Vulnerability of National Park
	Health Vulnerability for Other Air Contaminants	Agriculture (5)	Vulnerability of Soil Erosion in Farmland
	Vulnerability for Infections Diseases by Insects and Rodents		Vulnerability of Cultivation/Breeding Facilities
	Health Vulnerability for Waterborne Diseases		Vulnerability of Rice Productivity
Forest (7)	Landslide by Localized Torrential Downpours		Vulnerability of Apple Productivity
	Vulnerability of Forest Road by Landslide		Vulnerability of Livestock Productivity
	Vulnerability by Elements	Marine/ Fishery (1)	Vulnerability of Fishery (Aquaculture) Due to Water Temperature Change
	Vulnerability of Pine Trees due to Disease and Pest	Disaste/ Calamity (4)	Vulnerability of Infrastructure due to Flood
	Vulnerability of Pine Trees and Pine Mushrooms		Vulnerability of Infrastructure due to Heat Wave
	Vulnerability of Forest Vegetation		Vulnerability of Infrastructure due to Cold Wave
	Vulnerability of Forest Vegetation due to Draught		Vulnerability of Infrastructure due to Sea Level Rise

4. VESTAP

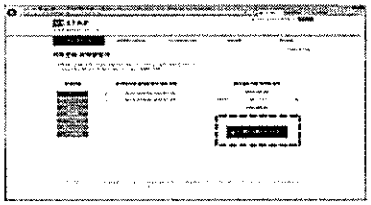
4.2 Development

❖ **Building CCV assessment tool(VESTAP)**

• the user interface was designed for unskilled workers to use easily and simply, based on minimum three steps – start-up screen, choosing conditions, obtaining results.



< Main screen>



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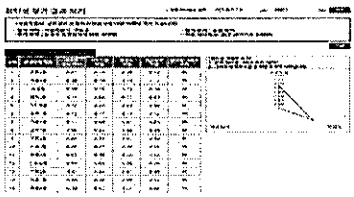
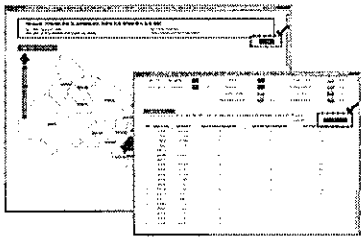


<Acquiring results>



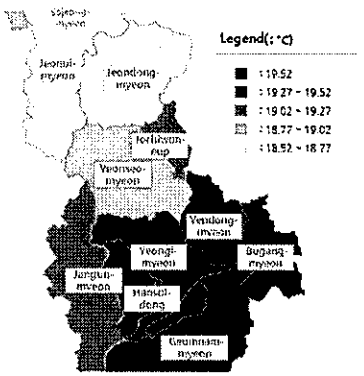
<Downloading results>

4. VESTAP

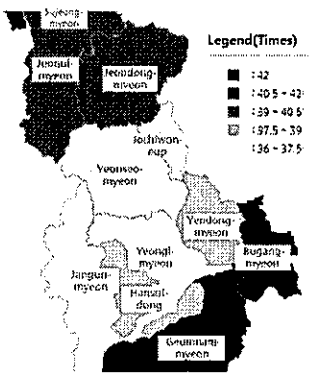
4.3 Pilot test (Sejong Metropolitan Autonomous City)

❖ **Pilot test of health vulnerability assessment by particulate matters in Sejong Metropolitan Autonomous City**

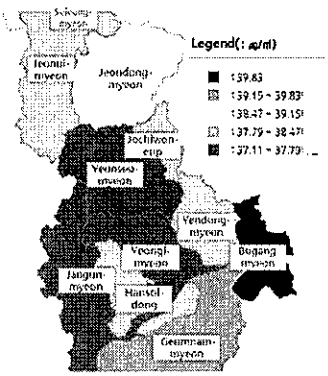
• **Climatic exposure impacts in Sejong Metropolitan Autonomous City, (a) Annual average of daily maximum temperature, (b) Number of times that fine dustconcentration is 100ug/ m3 or more days, (c) Annual average concentration of fine dust**



(a)



(b)



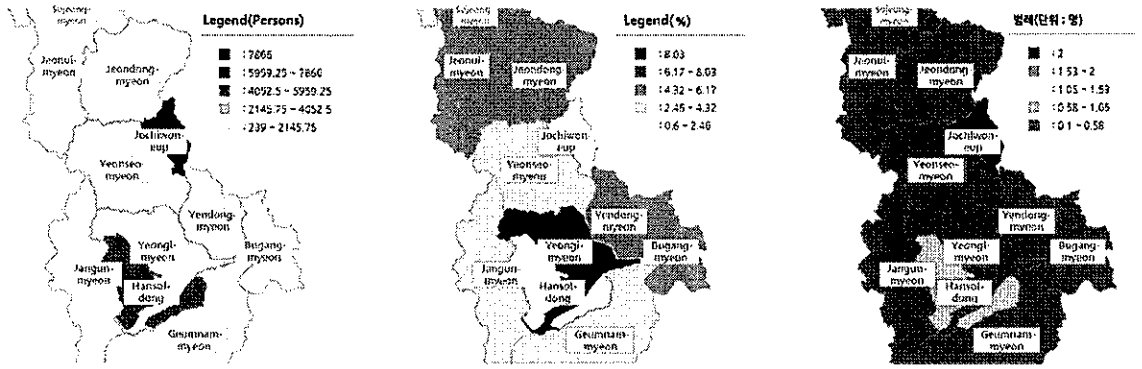
(c)

4. VESTAP

4.3 Pilot test (Sejong Metropolitan Autonomous City)

❖ **Pilot test of health vulnerability assessment by particulate matters in Sejong Metropolitan Autonomous City**

- **Sensitivity impacts in Sejong Metropolitan Autonomous City, (a) Population under 14 years old, (b)Elderly people living alone (aged 65 and over) Rate, (c) Number of patients hospitalized respiratory disease**



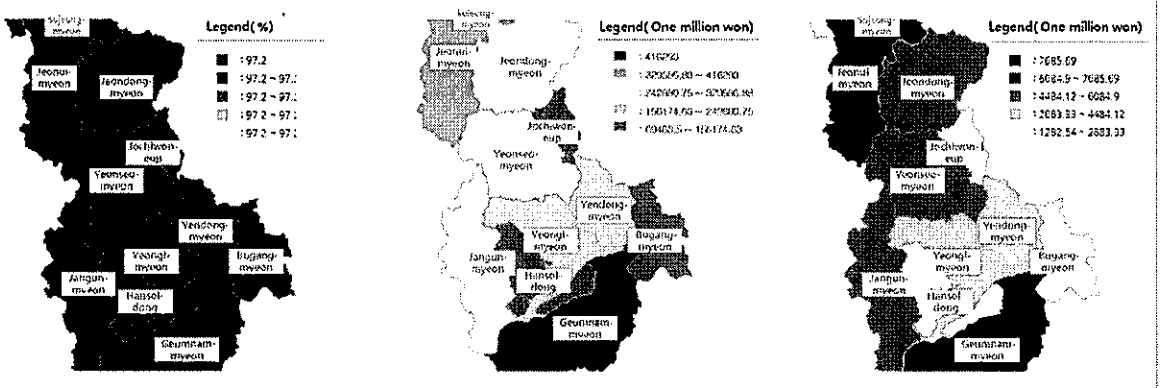
(a) (b) (c)

4. VESTAP

4.3 Pilot test (Sejong Metropolitan Autonomous City)

❖ **Pilot test of health vulnerability assessment by particulate matters in Sejong Metropolitan Autonomous City**

- **Adaptive capacity impacts in Sejong Metropolitan Autonomous City, (a) Health Insurance Coverage population ratio, (b) Regional GDP, (c) GRDP Healthcare Services and Social Services**



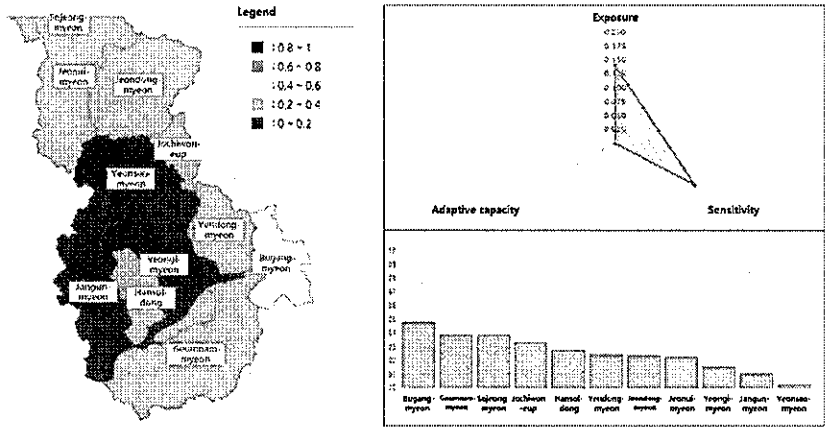
(a) (b) (c)

4. VESTAP

4.3 Pilot test (Sejong Metropolitan Autonomous City)

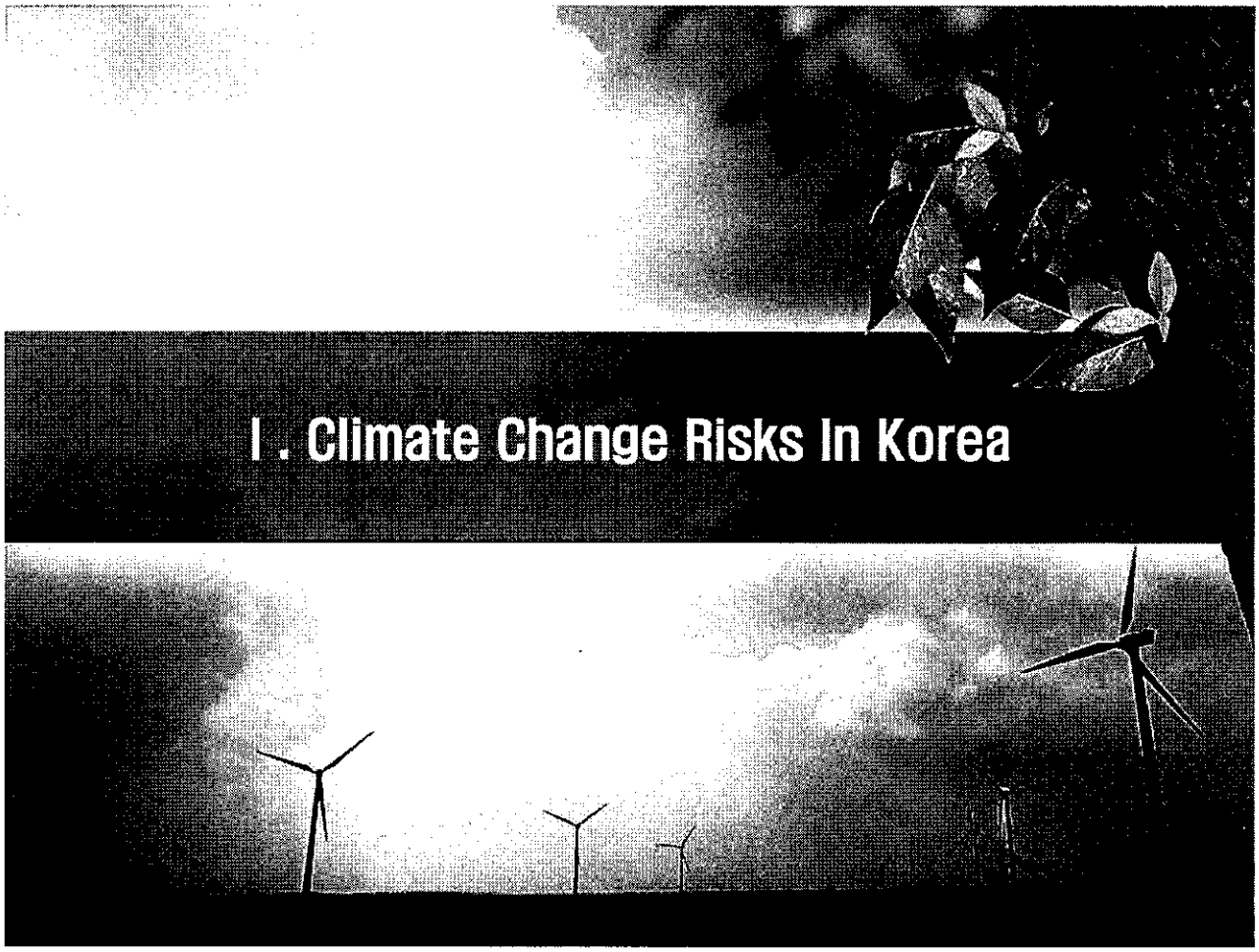
❖ **Pilot test of health vulnerability assessment by particulate matters in Sejong Metropolitan Autonomous City**

- **A health vulnerability assessment by particulate matters in Sejong Metropolitan Autonomous City was performed using the VESTAP, and Bukang-myeon showed the highest vulnerability.**



Korea' s experience on Climate Change Adaptation and its Future Plans

CONTENTS

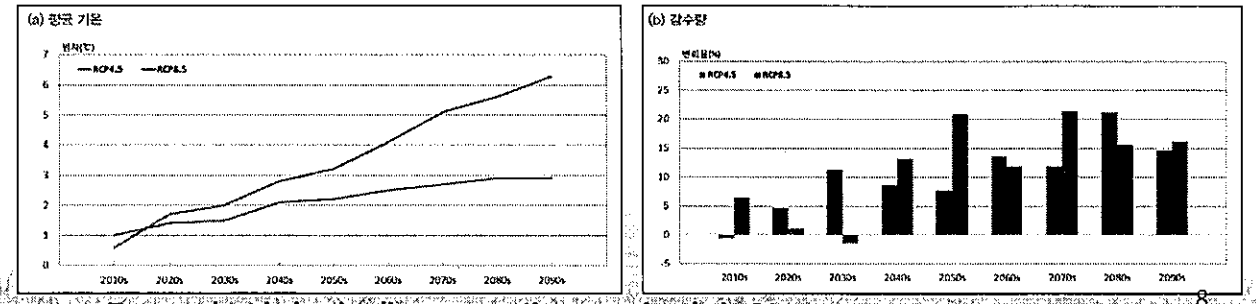


Ⅰ. Climate Change Risks In Korea

Prospects of Climate Change in Korea (End of the 21st Century, RCP8.5)

- **(Climate) 3.2℃ increase until 2050s, Season length change**
  - The subtropical zone is projected to expand from South coast to the whole country except inland areas
  - Longer summer season, and winter of Jeju and Ulleung islands will be disappeared
- **(Rainfall) Increase in 15.6% rainfall and 13% precipitation intensity by 2050s, Increase in localized torrential downpours**
  - Increase rainfall in late spring and early summer than summer, damages due to heavy rain is expected during spring and autumn.

(Source: Meteorological Office, 2012)

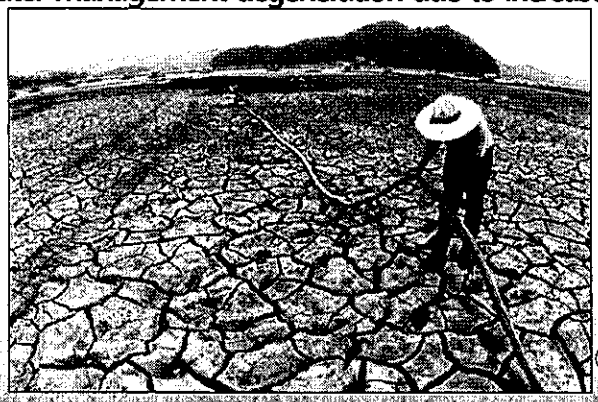


<Temporal variation in climate over Korea peninsula in 21st century (left: climate, right: rainfall)>

Major Risks

(Source: KEI, 2014)

- **(Health) Increase in death, disease and infectious disease due to climate increase, heat wave, disasters**
  - Heat wave death toll : ('30s) 4,820 → ('50s) 11,673
  - Disease burden(KRW) due to heat wave and abnormal temperature : ('10s) 53 billion → ('20s) 103.9 billion → ('50s) 1 trillion 437.7 billion
- **(Water) Rainfall changes, water management degeneration due to increases in flood and droughts**



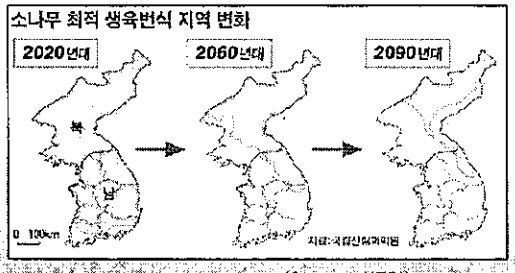
(Source: YonhapNews)

Major Risks

(Source: KEI, 2014)

- **(Forest/Ecosystem) Biodiversity decline, aggravation of habitat, increase in pests and forest fire**
  - Rapid loss of endemic species, increase survival rate of pest, etc
- **(Land/Coast) Urban heat island due to climate increase and disasters, SOC function degradation, Coast erosion, increase flooding vulnerability**
  - Roads, rivers, and other public facilities are 87% of the extreme weather related damages and 59% of the restoration expenditure
  - Due to the concentrated population and infrastructure density, climate change impacts and damages are greater

Changes in optimum pine growth regions

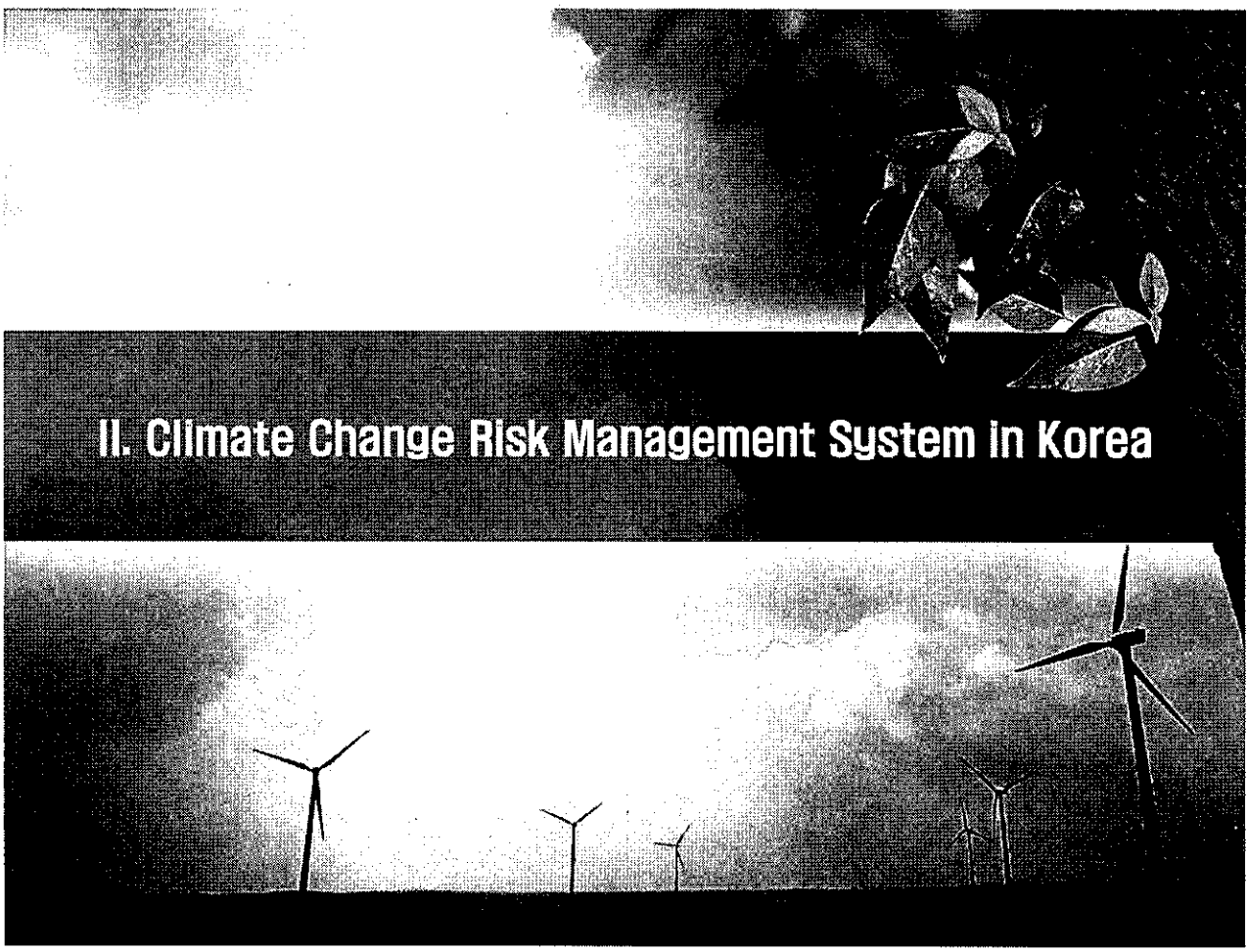


(Source: KFRI)

Major Risks

(Source: KEI, 2014)

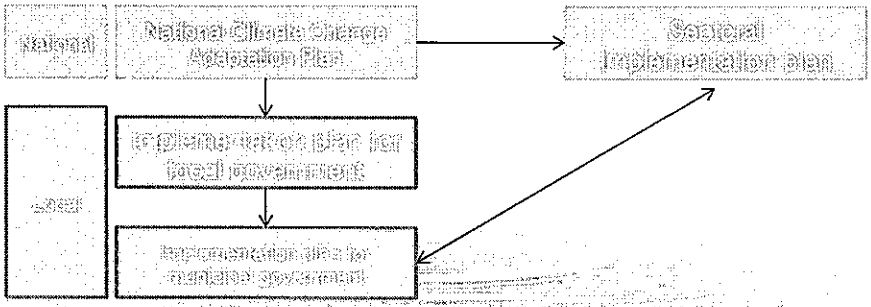
- **(Agriculture and Livestock) Increase vulnerability of agricultural and livestock systems, Adverse effects on livestock growth and cultivation, Increase agricultural waste**
  - Economic damage from food sector(KRW): ('50s) 296.4 billion→ ('00s) 613.5 billion
  - 60% of agricultural infrastructure are old
- **(Marine) Species and habitat change, pests and diseases increase, destroyed ecosystems**
  - Hazardous marine life and venomous creatures due to rising sea temperatures; Change in ecosystem, food chain, biological diversity due to ocean acidification



II. Climate Change Risk Management System in Korea

Legal Basis and System

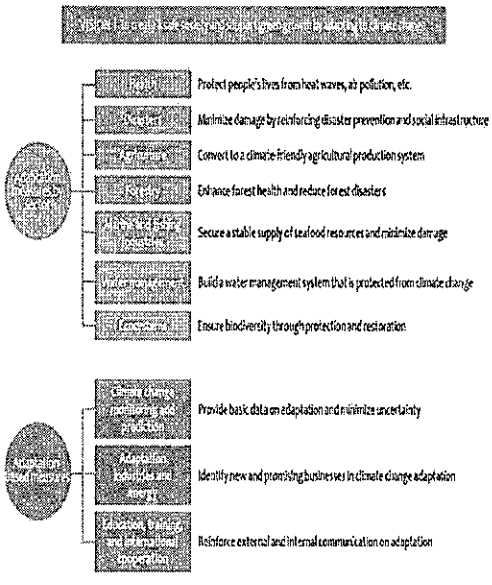
- **(Legal Basis) According to the Clause 4, Article 48 of the Framework Act on Low Carbon, Green Growth and the Article 38 of its Enforcement Ordinance**
  - The Government shall exert itself preferentially for preventive management to reduce damage that may be caused by climate change and shall establish and implement countermeasures for mitigating impacts of climate change or for coping with health and natural disasters, as prescribed by Presidential Decree
- **(System)**



<Climate Change Adaptation National Plan System>

National Climate Change Adaptation Master Plan ('11~'15)

- **The 1st National Climate Change Adaptation Masterplan('10.12)**
  - **(Period)** 2011 ~ 2015
  - **(Characteristics)** As comprehensive national adaption plan, vision and direction of the national adaptation policy is suggested.
  - **(System)** 2 areas, 10 sectors, 87 measures
  - **(Participated Ministries)** 13 Ministries including Ministry of Environment
- **Revision of the 1st Plan ('12.12)**
  - Outcomes of RCP Scenario applied
  - 9 areas, 67 measures



(Resource: related ministries, 2010)

Achievement of the 1st Adaptation plan

- **National Level Climate Change Adaptation System**
  - Detailed national adaptation process, Establish direction for the national adaptation, Implement sectoral project
  - Suggest detailed plan and basic system at central government and local government level
- **Sectoral/Local Climate Change Adaptation Support**
  - Implement central government's detailed plan, impalement sectoral adaptation
  - Support local government to establish/implement adaptation plan
- **Scientific basis of climate change adaptation**
  - Provide standard and high resolution climate change scenarios, vulnerability maps, and assessment tool to local and municipal government
- **Increase climate change adaptation awareness and build an adaptation partnership**
  - Climate change adaptation policy promotion, education, international cooperation

Achievement of the 1st Adaptation Masterplan (by sector)

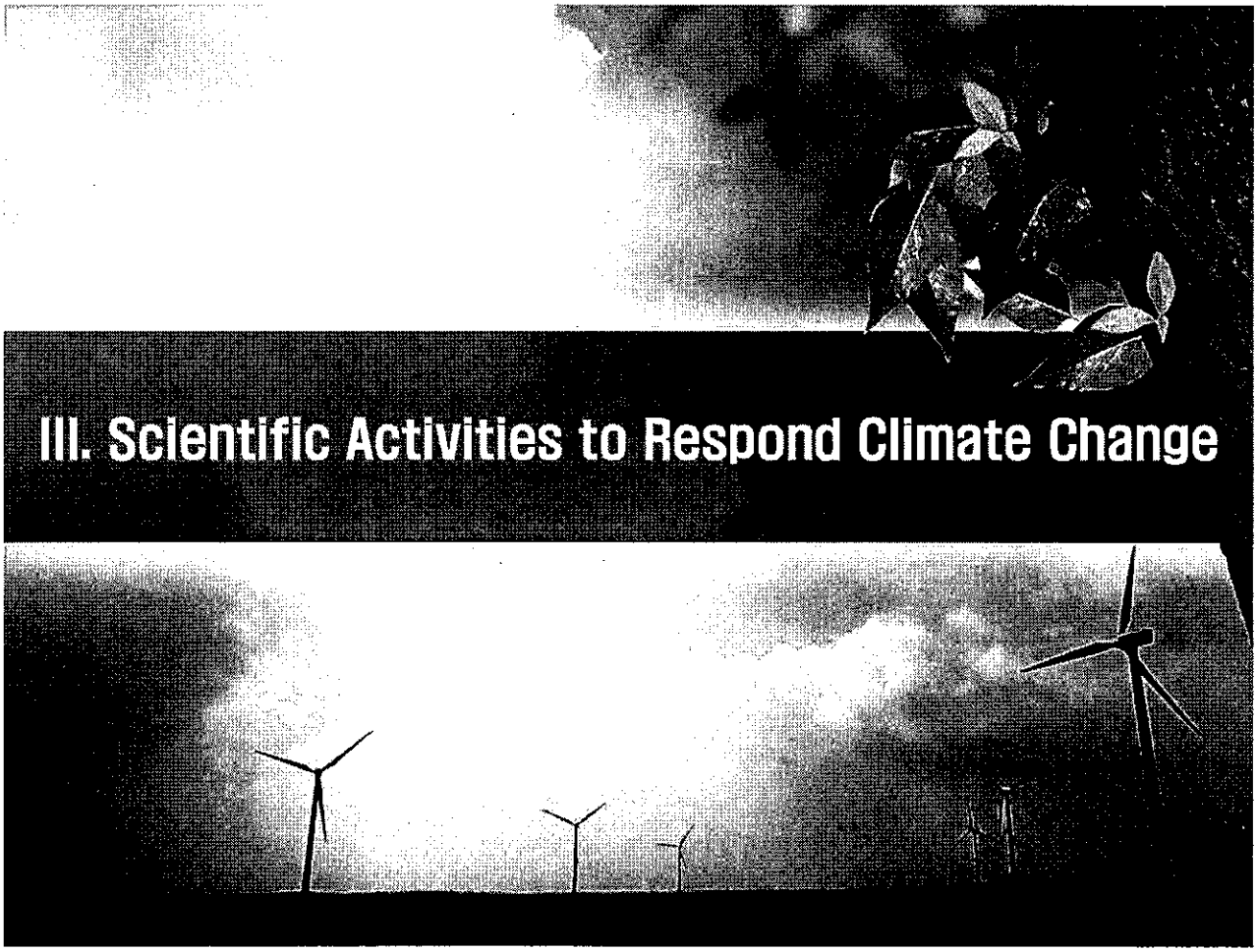
Sector	Major Performance
Health	• Monitoring system on climate change health impacts - Climate change related diseases DB, etc., • Health risk reduction strategies due to abnormal weather - Develop and supply a relevant manual, introduce what to do to prevent heat wave, etc.,
Agriculture and Fisheries	• Monitoring system, predicted climate change impacts in agricultural and fisheries sectors - Produce high resolution scenario for agriculture, build fisheries monitoring system, etc., • Climate change adaptation resource management, production technology development - Develop species adapt to climate change, disease diagnosis and prevention for conservation of aquatic resources
Water Management	• Enhance prediction and water monitoring system through water resource monitoring network, aquatic ecology investigation • Water resource management for safe water - Enhance water management system considering climate change, advance river management, etc • Enhance infrastructure facilities, dimension capability for floods and droughts - Flood-risk map for national stream, etc.,
Natural Disasters	• Policy targeting high disaster risk areas and facilities vulnerable to natural disasters - Relevant standards and establish preventive measures, improve ability to predict landslide damages • Disaster preparedness for urban planning

Achievement of the 1st Adaptation Masterplan (by sector)

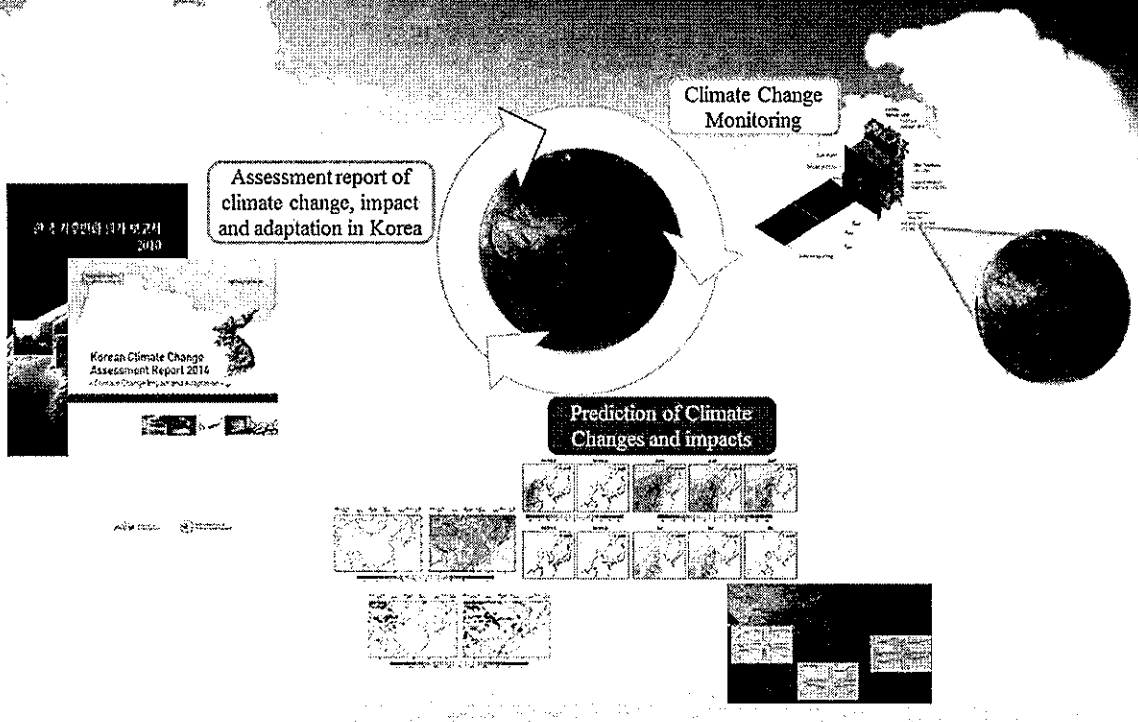
Sectors	Performance
Forest/Ecosystem	• Long-term ecosystem monitoring - Research on long-term ecological changes, pilot project on national climate change biological indicators monitoring, etc., • Systemic management of biological resources through habitat and species protection
Land/Coast	• Climate change vulnerability analysis for land, infrastructure - Guideline for vulnerability analysis, technical research, research development projects • Improve disaster prevention system • Reduction in climate change impacts and enhance adaptive capacity -Expand green areas for heat island
Industry	• Climate change vulnerability assessment and risk management • Enhance adaptive capacity through adaptive technology development - R&D investment, joint climate change adaptation plans, etc., • Climate change adaptation targeting private sectors, adaptation industries - Extend agricultural insurance products

Limitation of the 1st Plan

- **Difficulty in making a tangible outcome**
  - Absence of sectoral short-term, medium and long-term goals, adaptation priority, and indicators
  - Lack of systematic implementation monitoring and evaluation
  - Within the range of budget
- **Insufficient strategic framework for promoting adaptation**
  - Lack of decision supporting tools, experts and scientific based adaptation policy
  - Lack of communication among local government, industries
  - Overlap problem and lack of connectivity due to each government's project



III. Scientific Activities to Respond Climate Change



1. Assessment of Climate Changes and Impacts

The progress of Korean Climate Change Assessment Report

1st National Climate Change Assessment Report publishing plan established

2nd National Climate Change Assessment Report publishing plan established

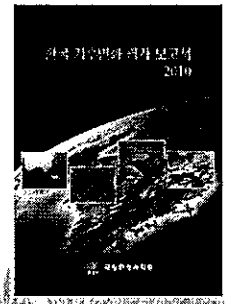
Research to publish the climate change assessment report (Literature survey and analysis)

Research to publish the climate change assessment report (Literature survey and analysis)

Expert review for draft report, and revision

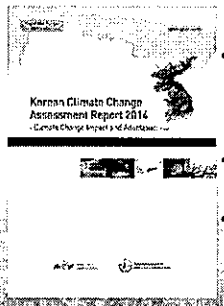
2009 2010 2011 2012 2013 2014 2015

「Korean Climate Change Assessment Report 2010」



- Contents
  - Part 1 : Observation and prediction of climate change (6 chap.)
  - Part 2 : Impacts, adaptation and vulnerability(8 chap.)
- Cited literature
  - Part 1 : 1,003 Part 2 : 732
- Participated author
  - Part 1 : lead 12, contribute 27, review 7
  - Part 2 : lead 7, contribute 25, review 34

「Korean Climate Change Assessment Report 2014」

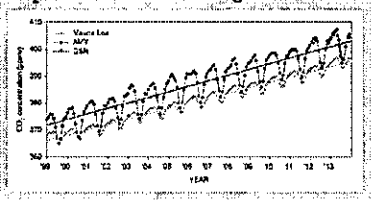


- Contents
  - Part 1 : The physical science basis (10 chap.)
  - Part 2 : Climate change impact and adaptation (10 chap.)
- Cited literature
  - Part 1 : approx. 1,000 Part 2 : approx. 1,500
- Participated author
  - Part 1 : lead 13, contribute 42, review 22
  - Part 2 : lead 10, contribute 29, review 39

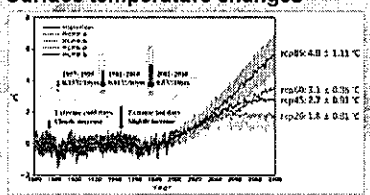
1. Assessment of Climate Changes and Impacts

Korean Climate Change Assessment Report–Main Results

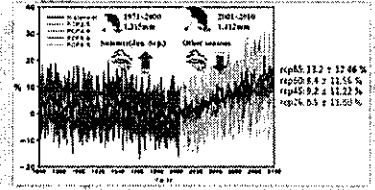
- CO_2 conc. trends at background sites



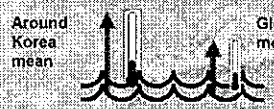
- Surface temperature changes



- Precipitation changes



- Sea level and surface temperature change



- Water resource impacts

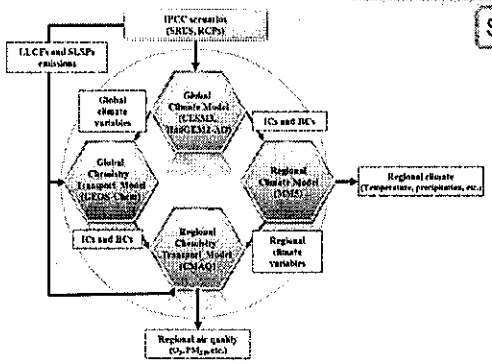
- Ecosystem and forest impacts

- Agricultural impacts

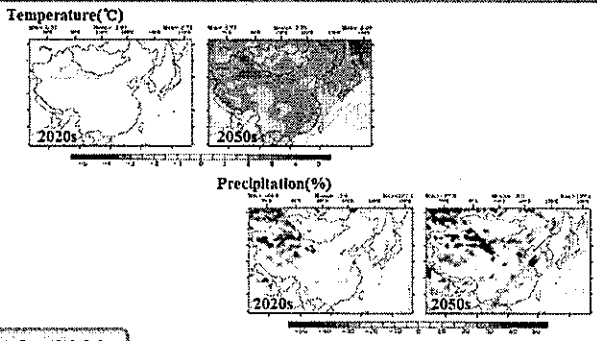
- Health impacts

2. Prediction of Climate Changes and Impacts

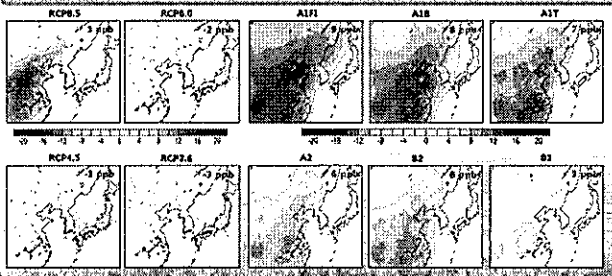
Prediction of Climate & Air Quality Changes under IPCC Scenarios

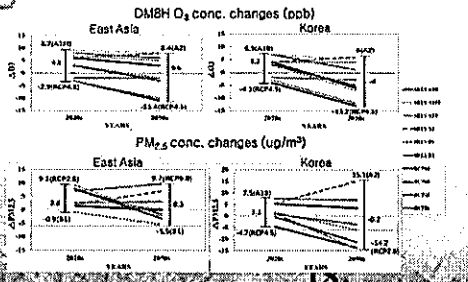


Spatial distribution of temperature and precipitation change for RCP8.5



Spatial distribution of DM8H O_3 conc. changes for 2020s

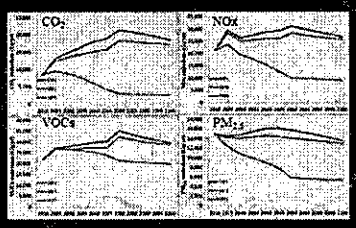


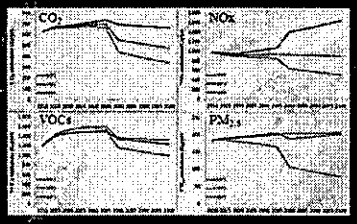


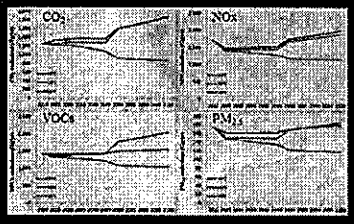
2. Prediction of Climate Changes and Impacts

New Scenarios specified in Northeast-Asia

- A future emission scenarios for S. Korea, China and Japan was developed in Mar. 2015 with NIER
- The scenarios reflect current status and future plans on national-oriented-specific socio-economic situation, environmental regulations and climate mitigation programs, and SSPs(Shared Socioeconomic Pathways)
- The scenarios include LLCFs(CO_2, CH_4, N_2O etc) and SLCPs(NOx, VOCs, SO_2, PM etc) emissions
- MESSAGE was adopted for China and AIM was adopted for S. Korea and Japan
- Participants: National Institute for Environmental Studies, Japan



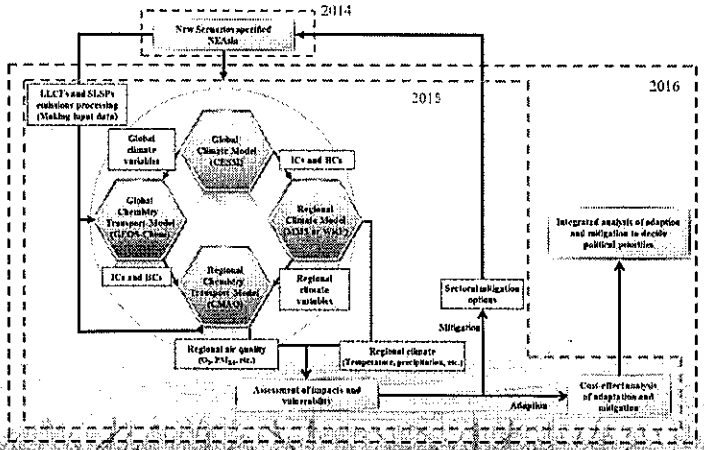




2. Prediction of Climate Changes and Impacts

Prediction of Climate & Air Quality Changes under New Scenarios

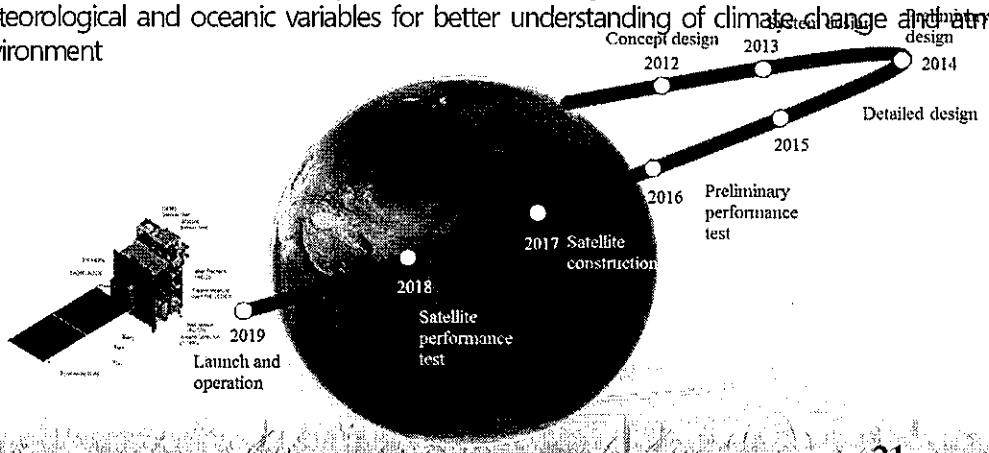
- New project (2-years) will be launched in mid-2015 with NIER and MOE
- Aim: prediction of climate and air quality changes, estimation impacts and adaptation-mitigation under new scenarios
- Contents: climate and air quality modeling (global and regional), impact assessment, and cost-effect analysis of adaptation and mitigation
- Goal : drawing optimized scenario that minimizes the adverse effect of climate change and acquire political priorities



3. Climate Changes Monitoring

Progress of Geostationary Environment Monitoring Satellite

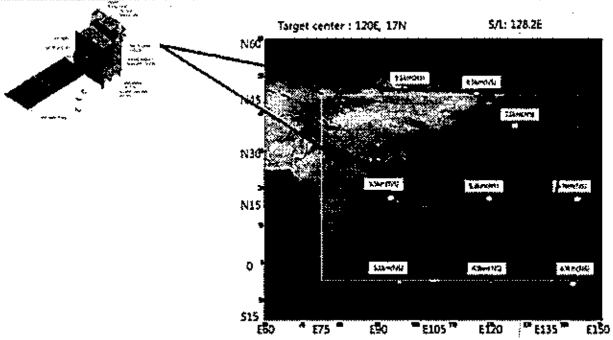
- National Institute of Environmental Research (NIER), Ministry of Environment, Republic of Korea is planning GEMS (Geostationary Environment Monitoring Spectrometer) program to be launched in 2019 onboard a GEO-KOMPSAT-2B (GEOstationary KOrea Multi-Purpose SATellite 2B) which is supposed to be the successive mission of COMS (Communication, Ocean and Meteorological Satellite)
- It is essential to monitor air pollution (SLPCs : O_3, HCHO, Aerosol) with measurement of meteorological and oceanic variables for better understanding of climate change and atmospheric environment



3. Climate Changes Monitoring

Brief Description of GEMS

Coverage and specifications

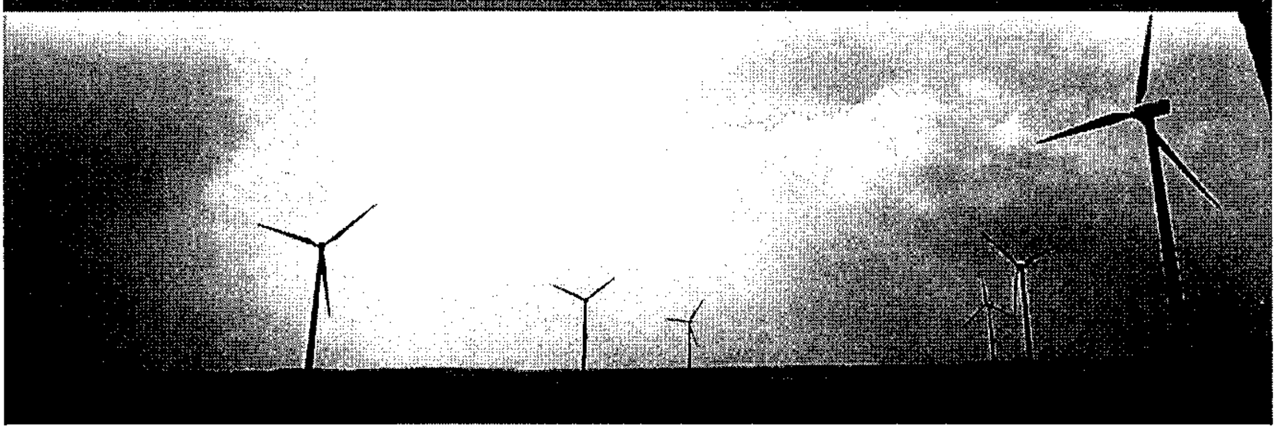


Targeted gases	O_3, SO_2, NO_2, HCHO, Aerosol
Lifetime	10 years
Spatial coverage	5,000 km × 5,000 km (5 °S - 45 °N, 75 °E - 145 °E)
Spatial resolution	Gas : 7 km × 8 km Aerosol : 3.5 km × 8 km
Spectral resolution	0.6 nm
Revisit Time	8 times/day (30min imaging + 30 min rest)
Wavelength	UV ~ VIS (300 ~ 500 nm)
Volume	1,050 mm × 1200 mm × 900 mm
Mass	160 kg
Power	200 W
Orbit	Geostationary orbit
Longitude	128 °E
Altitude	35,786 km

Expected outcomes

- Enhanced reliability of SLCPs concentration and emissions in East Asia with high spatio-temporal scale observation
- Enhanced understanding of interactions between air chemistry and climate change
- Quantification of East Asian pollution contribution to global tropospheric chemistry
- Evaluation/validation of chemistry models
- Continuous monitoring of transboundary and transpacific transport of air pollutants

IV. Direction for the 2nd national climate change adaptation plan



2nd Adaptation Plan

- **Contents**

  - **(Name)** The 2nd National Climate Change Adaptation Plan (2016~2020)

  - **(Basis)** Safe society, National happiness

  - **(Indicator)** Vision plan indicator (Present > 2020 > 2035)

  - **(Period)** 2016~2020, Based on 20 years vision, five years plans

  - **(Participation)** 21 Climate change adaptation related ministries (Expected)

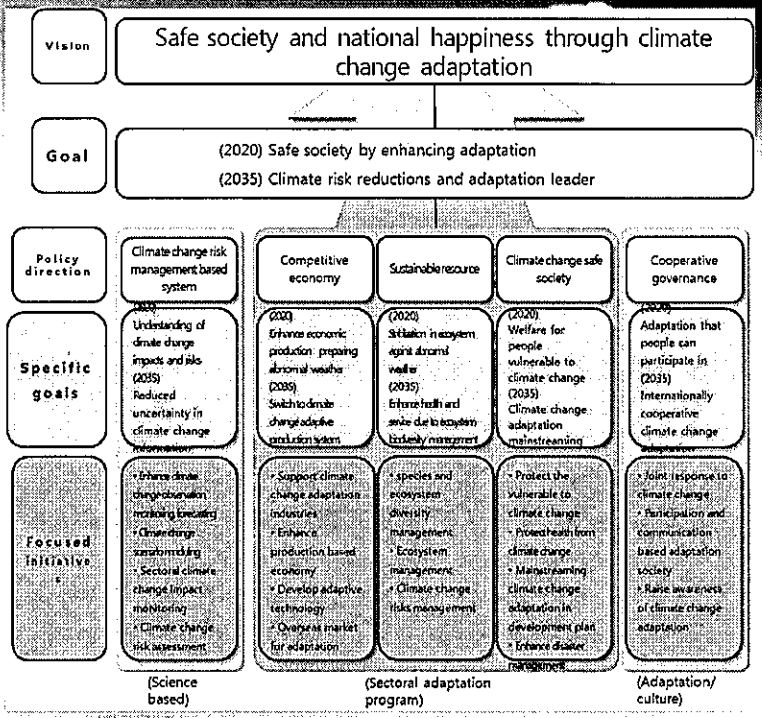
※ Ministries: Ministry of Strategy and Finance, Ministry of Education, Ministry of Science, ICT and Future Planning, Ministry of Foreign Affairs, Ministry of Unification, Ministry of National Defense, Ministry of Government Administration and Home Affairs, Ministry of Culture, Sports and Tourism, Ministry of Agriculture, Food and Rural Affairs, Ministry of Trade, Industry and Energy, Ministry of Health and Welfare, Ministry of Environment, Ministry of Employment and Labor, Ministry of Land, Infrastructure and Transport, Ministry of Oceans and Fisheries, Ministry of Public Safety and Security, Ministry of Food and Drug Safety, Korea Meteorological Administration, Rural Development Administration, Korea Forest Service, Cultural Heritage Administration

Differentiation from the 1st plan

- **New policies reflect internal and external policy environment**
  - Continued initiative, select projects, maintain consecutiveness
  - Added new measures for the risk which are previously not reflected priorities risks and new adaptation trends

Vision/System

- **(Vision)**
  - Safe society and national happiness through climate change adaptation
- **(Goal)**
  - 5 years short term, 20 years medium-long term
- **(System)**
  - 2+3 system
  - 5 direction·Specific goals, 20 specific projects



Areal Direction and Goals, Focused Initiatives

- **Adaptation Basis (1) : Institutional and cultural basis**

Division	Contents
Vision	**Cooperative adaptation**
Specific goal	• (2020) Adaptation that people can participate in • (2035) Internationally cooperative climate change adaptation
Planning indicator	• National adaptation awareness • Climate change education beneficiary countries
Focused initiatives	1-1. Enhance climate change adaptation system 1-2. Enhance regional adaptation capacity building 1-3. Joint response to climate change adaptation 1-4. Adaptation awareness and activate involvement

Areal Direction and Goals, Focused Initiatives

- **Adaptation Basis (2) : Science-based basis**

Division	Contents
Vision	**Science-based climate change risk management**
Specific goal	• (2020) advance in climate change impacts/risks identification • (2035) reduced the uncertainty of climate change information
Planning indicator	• Accuracy • Vulnerability map
Focused initiatives	2-1. Climate change observation-monitoring-prediction capacity building 2-2. Develop climate change scenario / expand utilization 2-3. Enhance climate change impact monitoring 2-4. Climate change vulnerability assessment / risk management system 2-5. Climate change adaptation information supporting system / DB

Areal Direction and Goals, Focused Initiatives

- **Sectoral Adaptation program (1) : Economy**

Division	Contents
Vision	**Sound and Competitive economy**
Specific goal	• (2020) Enhance production-based economy to prevent abnormal weather • (2035) Switch to climate change adaptive production system
Planning indicator	• Oversea markets • Domestic adaptive industry rate
Focused initiatives	3-1. Support climate change adaptation industries 3-2. Increase industry's exposure to climate risks 3-3. Develop climate change adaptation technology 3-4. Oversea adaptation market

Areal Direction and Goals, Focused Initiatives

- **Sectoral Adaptation program (2) : Environment**

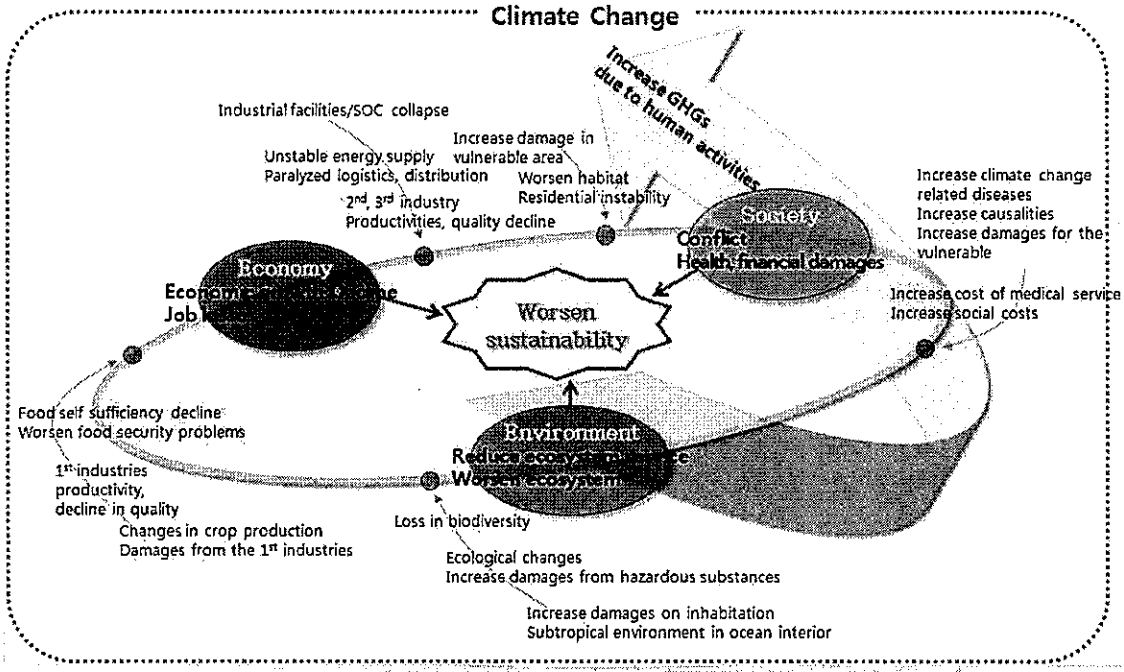
Division	Contents
Vision	**Sustainable conservation of natural resources**
Specific goal	• (20) Ecosystem stabilization under abnormal weather • (35) Improve health and service through systemic biodiversity management
Planning indicator	• Number of biological genetic resources • Protected areas of organisms/ecosystem
Focused initiatives	4-1. Species and ecosystem diversity management 4-2. Ecosystem habitat management 4-3. Ecosystem climate risk management

Areal Direction and Goals, Focused Initiatives

- **Sectoral Adaptation program (3) : Society**

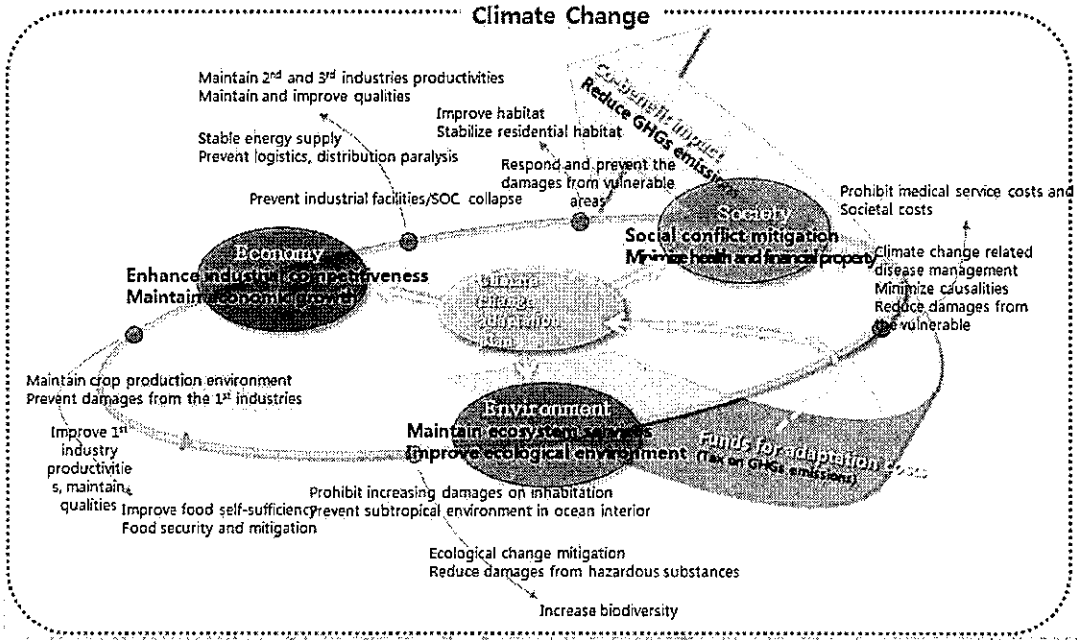
Division	Contents
Vision	**Establishing climate-safe society**
Specific goal	• (20) Welfare for the vulnerable, improve regional management • (35) Improve social system through climate change mainstreaming
Planning indicator	• Reduce health damage due to abnormal temperature • Reduce facility damage
Focused initiatives	**National adaptive capacity building** 5-1. Protecting the vulnerable to climate change 5-2. Prevent health and enhance management **Living management** 5-3. Minimize regional and facilities damages 5-4. Enhance disaster management

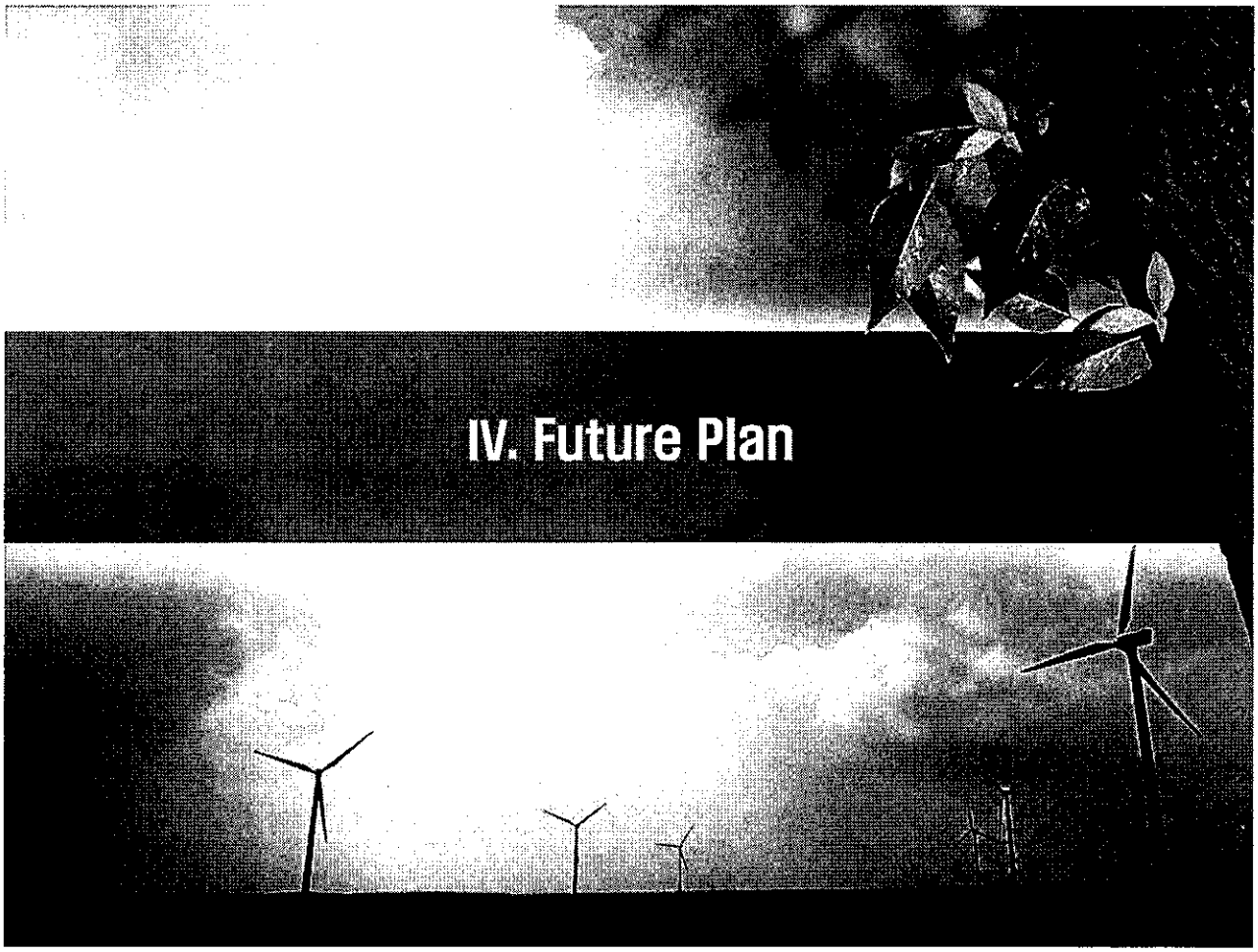
Effect through the 2nd Adaptation Plan



Effects from the 2nd Adaptation Plan

- **Effects from the 2nd adaptation plan: virtuous cycle**





IV. Future Plan

Future Plan

TIME	CONTENTS
STEPTEMBER	**1. Public Hearing** • Date: Sept. 21, 2015, 14:30~18:30 • Venue: Korea Chamber of Commerce & Industry (KACCI) Meetingroom A **2. Report to Presidential Committee on Green Growth & Cabinet council**
OCTOBER - NOVEMBER	**1. Development of the ministerial implementation plan**
DECEMBER	**1. Finalization of the 2nd Adaptation Masterplan**


Thank you!!

IIASA

KOREA UNIVERSITY BK21 PLUS ELEC

The 3rd IIASA-KU Workshop for Mid-Latitude R/D Network

Workshop Summary Report

Korea University, 16-17 March 2016

Table of Contents

1. Background

It is clear that we have confronted with grave challenges to solve the conflicts of climate change, biodiversity and energy shortage and to achieve sustainable development on global and regional scale.

An adaptation approach to climate change requires better knowledge of regions and processes, and research findings should be directed in a way to enhance in adaptive strategies against climate change. Such researches and proposing of policies regarding climate change should concentrate on improving regional understandings.

The Mid-Latitude zone can be broadly defined as part of the northern hemisphere between 30°-60° latitude. In terms of demographics and level of economic development in the Mid-Latitude region, approximately 50% of the world population lives in this region, and the scope of research are adjusted to the area particularly between 20°N - 40°N. The Mid-latitude zone is regarded vulnerable to climate; even small changes of climatic indicators (temperature, precipitation) may provide substantial impacts on ecosystems in this zone because the land cover of a number of countries in Mid-Latitude are comprised mostly of arid or semi-arid area. Therefore, we have to expand our knowledge of environment of the Mid-Latitude through continuous research and investigation.

In May 2015, we had 1st international workshop for Mid-Latitude in Seoul and built international R/D Network for Mid-Latitude as well as Korean Industry & Academy Cooperation for Mid-Latitude R&D Initiative.

Through the Side Event (2nd Mid-Latitude workshop) at Korea Pavilion of COP21 in 2015, Paris, we shared ideas for climate change and spatial resilience across the Mid-Latitudes. It will contribute to build framework for climate change mitigation, adaptation, and sustainable development.

Through our 3rd workshop for Mid-Latitude, subsequently run in 3 parallel sessions - covered;

1) Setting and developing the research scope, area and time plan for the EU-Horizon 2020 project,

2) finding of cooperative possibility with each international organizations,

3) investigation of action plans for the Mid-Latitude research by the Young Scholar Committee (founded by the BK21Plus Eco-Leader Education Center (ELEC) for wise adaptation to climate and environment changes in 2015).

Furthermore, future plans will be arranged with IIASA to prepare the proposal document for the EU-Horizon2020.

2. Preparatory Meeting for formulating EU-Horizon 2020 Workshop (16 March 2016)

1) EU-Horizon 2020

○ One of the calls of EU-Horizon 2020 (hereafter H2020) 'Closing loops at farm and regional levels to mitigate GHG emissions and environmental contamination - focus on carbon, nitrogen and phosphorus cycling in agro-ecosystems' deals with biogeochemistry since it deals with C, N, and P flow.

○ **The importance of organizing the consortium**: the competition for the calls of H2020 is very competitive. Almost 300 groups apply for the call to get the 12 million euro fund. To win the competition, the consortium is very important. Even a competitive research organization is hard to get the fund. Thus, the major part of the consortium should be based in Europe. Also, the leader or the coordinator should be the best suited of the network showing relevant experience (having led EU projects before) and relevant expertise. IIASA is checking internally whether they will coordinate the submission/consortium or partner up with another renowned institute. There should be a decision within the next couple of weeks.

○ **Clarifying the scope of Mid-Latitude region; defining the latitudinal zone / where to prioritize our interest?** : to win the call, the scope should not be (only) focusing on Mid-Latitude but Europe including Mediterranean. Focusing on Mid-Latitude region is certainly important but we need to prioritize areas that are of common interests. Building reputation of Mid-Latitude research initiative should be the first thing. Hence there might be a (sub-) chapter on the Mid-Latitude topic.

The potential H2020 project with possible KU participation will consist of 10 to 12 partners, maximum 15 partners. The total call budget of 12 million Euro might be split between 3-4 successful projects, allowing for a budget of 3-4 million per project.

KU can participate as a full partner (according to EU regulations) but needs to come up with its own funding (usually granted to successful participants by a relevant Korean ministry.

○ **ERC grant** : there is an ERC grant (one of the top-reputational science grants in Europe) which IIASA is co-leading. It is related to the topic 'Closing loops' since it deals with biogeochemistry knowledge (N, C, P flow). This is an important background and proof of expertise for responding to the H2020 call.

○ **Setting out the scope of research into Mid-Latitude region is a creative approach and more justification needed** : Mid-Latitude can be included in the proposal with strong justification points:

- 30 to 50 percent of the world population is living in the M-L region
- Agriculture and agroforestry is an important sector in the M-L region

- Migration is a hot issue that is potentially also climate driven in the M-L region and affects EU substantially
- Climate is crucial driver for development (or not development) of the region

However, the scope of the project is farm-level and regional, not necessary global; and we should find some more strong reasons and logic.

2) Comments on the presentation on Mid-Latitude and presentations from Young Scholar Committee (YSC)

o Presentation on Mid Latitude

- GDP is not an indicator which shows the real income of people.
- The scope of Mid-Latitude should not be a fixed square but a belt. For example, Mexico is one of the important countries that is included in Mid-Latitude, but it is not included in the square.

o **Presentation from Ms. Seajin Kim: Youth from GEYK Addressing Climate Change in Mid-Latitude Region**

- More opportunities should be given to younger generation, as there are little chances to get the funding to promote the work/activities of youth.

o **Presentation from Mr. Seongbong Heo: Environmental Injustice in Mid-Latitude: Observing extant unequal distribution of natural resources water, food, and forest**

- National inventory should be invested.
- The map is not made with high-resolution. The result should be different among the regions of a country. For example, the results of East side of China and West side of China are different.

o **Presentation from Mr. Chul-Hee Lim: Impact of Climate and Environmental Change on Food Productivity in Mid-Latitude with Modeling Approach**

- The scope of research fits into the 'Closing Loop' project. EPIC model has already been tested through previous research works.

o **Presentation from Ms. Jooyeon Moon: The impact of drought on terrestrial ecosystems in Mid-Latitude region**

- Drought is not directly related to agriculture. (e.g. Africa was suffering from droughts, there were more green due to more sunlight. Consider lag-time to droughts. Developing countries are more affected to the droughts since they do not have management capability.
- Systemic approach is needed, which includes environmental and social science. Methodology is important since there lies uncertainty.

o **Presentation from Mr. Cholho Song: Land Degradation and desertification assessment in Mid-Latitude for Environmental Sustainability**

- Long-term approach is needed. Comparing 2005 and 2008 is on short-period.
- The terminology should be fixed. Degradation, desertification and soil erosion are all different terms.

3) Concluding remarks and thoughts:

1. We need to better define our understanding of the M-L ecotone with the help of scientific/biophysical parameters etc.
2. We need to clearly define the borders of the region (not necessarily entire countries)
3. The M-L also exists on the Southern Hemisphere (even though we might first focus on the Northern Hemisphere and here on a Eurasian approach)
4. We need to prioritize the most necessary needs such as data collection etc. – low-hanging fruits need to come first
5. We need to identify the gaps of knowledge
6. We need to "construct" our work and projects on M-L in a puzzle-like style, meaning that we need to find complementary approaches (smaller and bigger projects that provide funding to all partners) that fit to each other and ideally create synergies and multiplier effects
7. We need to "step-by-step" build up knowledge and awareness (promotion is the half way to funding) both in the science community and among the potential funders
8. This means that we need to start producing relevant documents such as scientific papers, reports, brochures etc.
9. Prof. Shvidenko and colleagues at IIASA are already working on a first scientific paper (journal for submission to be identified) that should contain a first outline of a scientific agenda and include status-quo, first gap assessment and the respective scientific methodologies to be applied in order to address the prioritized research questions. The draft manuscript will be circulated in about 2 months and should also serve as a justification collection and background document for making the M-L ecotone a topic in the H2020 proposal under preparation (by then).
10. Finally, it is of utmost importance that all activities will be coordinated in order to ensure, efficiency and effectiveness and complementarity of the individual projects (avoid duplications). It has been suggested that Prof. Lee and his team would take on the over-all coordination of the M-L topic.

4) First ideas on potential funding and project schemes, promotion options etc.:

1. **H2020** – respond to an identified call and make M-L a topic within the call objectives
2. H2020 potentially co-funded/matched by a **small and focused APN project** among respective eligible countries in the M-L area that cannot be easily included in the H2020 project.
3. Combined (or individual) approach under the new Chinese "**silk road initiative (One Be – One Road)**, potentially funded by the new **Chinese Development Bank** (and potentially matched/co-funded by a small APN project)

4. Activities with/under **Future Earth** (first start through GCP office Korea)
5. Activities under the Pan-European Experiment (**PEEX**)
6. The M-L network/partners should promote **masters and doctoral thesis** on one of the relevant topics of the M-L ecotone
7. **IIASA conference in 2017** - organizers could be requested to make M-L a topic with the possibility to submit posters and have talks on M-L (young scientists?)
8. **Scientific and policy events** – submit requests/organize sessions and side events (e.g. GLP open science forum (submit abstracts by 30 March), COPs, SBSTA (Bonn) etc.
9. Make **M-L a topic for IIASA's Young Scientists Summer Program (YSSP)** – potentially funded (1-3 students per year at 5k Euro each) by APN – focusing on excellent applicants from eligible countries that might usually not find funding)

3. Main conclusions from 3 consecutive sessions (17 March 2016)

▶ Prof. Woo-Kyun Lee (Korea University): Systems Analysis Approach to Climate Change Adaptation and Mitigation for Mid-Latitude Ecotone in connection with EU-Horiton 2020 Strategies

○ Mid-Latitude region requires our attention especially in terms of diversified land characteristics (i.e. mix of dry land/semi-arid land/temperate zone etc). Looking at indicators (more than 50% of world population living in M-L area, facing water scarcity, drastically different vegetation status due to land management practice as can be seen in the case of South and North Korea), meaningful scientific findings can be produced in this region.

○ GDP as an economic indicator is related to forest density because high income countries tend to better manage its forest whereas many of low income countries still use forests as its primary source of energy. Realizing these environmental and societal challenges of Mid-Latitude area, not only science sector but close connection with industrial sector seem timely and necessary. In this regard, Mid-Latitude R/D network has been established to promote and to realize the Mid-Latitude initiative.

▶ Ms. Ju Young Kim (EU Delegation to Korea): European Commission Horizon 2020 New opportunities to Korea

○ General information and application process is all listed in "Participant Portal"
○ Korean researchers, universities, research organizations and enterprises are able to team up with their European partners to participate in projects under Horizon 2020 and make the best use of Europe's excellent opportunities in research and innovation (i.e. IIASA etc).
○ Korean participants are not automatically eligible for funding through Horizon 2020.
○ Korean participants have themselves to determine the sources of funding and find the resources for their part of the project.
○ Matching fund: These may be own funds, as well as funds received from Korean ministries, foundations and other organizations (i.e. NRF, Ministry of Science, ICT and Future planning etc)

▶ **Dr. Florian Kraxner (IIASA): The Mid-Latitude Ecotone & Global Cooperation**

○ The scope of Mid-Latitude should be clarified. That being said, Mid-Latitude region should not be only confined to or limited to the area between 20 to 40 degree of northern hemisphere. More logical classification of Mid-Latitude is tentatively illustrated on Geo-wiki, for example, in terms of climatic characteristics or the type of forests etc. So M-L region should be defined by and reflect natural similarities, not simply refer to countries grouped in a box based on geographic proximity.

○ As suggested earlier in the preparatory meeting, we still need to close the gap of knowledge on Mid-Latitude initiative, and the best way to take on the first step is to produce something tangible, such as scientific outputs in the form of papers, reports etc. (i.e. seek for funding sources, for example, through *APN's call for proposals* which is also open to young scientists, or *ERC grants, EU's Marie Sklodowska-Curie Grants*)

○ In terms of enabling partnership, and leading collaborative project, IIASA has extensive hands-on experiences. But partnering institution (this case KU) should be able to manage coordinating activities to guide and keep track of the overall process of the collaboration work.

○ Partnering institutions in EU (namely, IIASA) should strategize the overall project scheme. 'Closing loop' which is suggested by Korea University should not be the only option but we still need to search for other potential proposals that are prepared by IIASA.

▶ **Prof. Anatoly Shvidenko (IIASA): Understanding the current and future resilience of the Mid-Latitude landscape of Eurasian continent: notes to potential collaboration**

○ As. Dr. Kraxner has mentioned, we need to clarify on the term 'Mid-Latitude Ecotone' and it's meaningful to focus in this region as it have clear manifold specifics that makes MLE a research objective of the global warming.
○ Organizing an international research collaboration group for drafting on the topic is proper and timely.

▶ **Prof. Seung Hee Kim (Chapman University): Application of Crop modeling in Mid-Latitude region**

○ Driving APSIM crop model in the Southwestern part of the US to assess the impact of climate change, and it is applicable in the Korean peninsula.
○ Recent trend of study is focusing on model inter-comparison and this trend should be reflected to Mid-Latitude region.

▶ **Dr. Hui-Chen Chien (PPACC)**

○ PPACC is making a Regional Adaptation Network, holds PPACC conferences, and willing to participate Climate Colab Contest by organizing a team, overseeing and

coordinating the contest.
○ PPACC will cooperate with countries in the Asia-Pacific region on climate adaptation and innovation.

▶ **Dr. Chi-Ming Peng (WeatherRisk Explore Inc.)**

○ WeatherRisk Inc. provides several services like weather forecasting, disaster forecasting, risk evaluation, weather analysis, weather risk management and so on.
○ WeatherRisk Inc. regards open data very important and can provide open data and processed data for Mid-latitude network.

▶ **Ms. Taniya Koswatta (APN)**

○ More opportunities should be given to young scientists. Follow up with the funding cycle. The closest APN funding opportunities will happen in 2016 August, and open call starts in May.
○ From the previous case, funding opportunity is more given to developing countries, so it is better to team up with research team in one of developing countries in Asia-Pacific Network.

▶ **Prof. Yowhan Son (GCP Korea Office)**

○ GCP Korea Office opened on June 11th, 2010 in Korea University. It holds GCP Scientific Meetings almost every year and has started to work on Mid-latitude researches and it is making connections between mid-latitude researches and GCP. GCP Korea Office is preparing for the international collaboration for EU-Horizon 2020.

▶ **Dr. Bernhard Seliger (Hanns Seidel Foundation)**

○ Hanns Seidel Foundation is implementing environmental projects in North Korea, such as sustainable forestry project, using energy wood and forests as carbon sinks. Also, it is supporting CDM and energy projects and brings out local solutions to the energy crisis using solar and biomass.

▶ **Dr. Jong-Soo Yoon (UN-OSD)**

○ Including SDGs within research initiative is a good start. And as it has been addressed by participants, Mid-Latitude zone need to be clarified and need to think about future road map, final destination of this research collaboration.

▶ **Prof. Yowhan Son (GCP Korea Office, Korea University)**

○ Mid-Latitude initiative has 2 phases; 1) R&D, 2) policy implementation and application. We need to prioritize and discover funding sources or agencies to focus on specific target (i.e. APN, Silk road etc) We need to invite more organizations from EU and countries in Mid-Latitude region and make real project with the support of APN, IIASA and other organizations.

The 3rd IIASA-KU Workshop for Mid-Latitude R/D Network

Seoul, Korea University

Contact:

Prof. Woo-Kyun Lee (leewkkorea@gmail.com)

Ms. Jooyeon Moon (mjy891024@gmail.com)

Ms. Seajin Kim (bluegulcy@gmail.com)

The 3rd IIASA-KU Workshop for Mid-Latitude R/D Network
Korea University

Pan Pacific Adaptation on Climate Change: A Regional Partnership and Global Platform

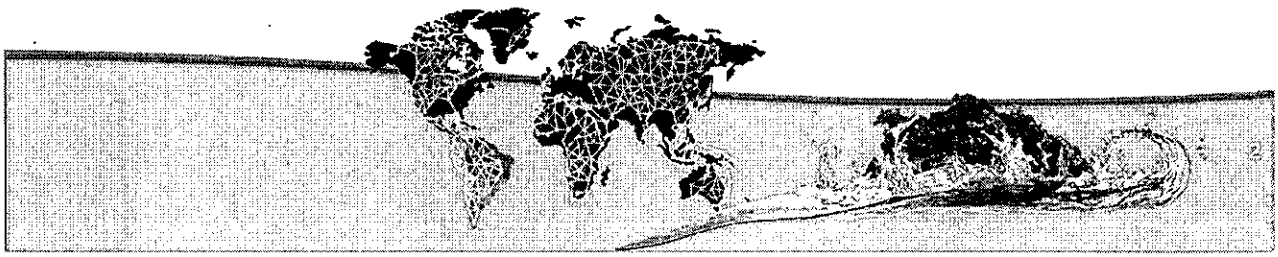
Dr. Hui-Chen (Jenny) Chien
Executive Director, GHG Office
Environmental Protection Administration (EPA), Taiwan

行政院環境保護署
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

Dr. Chien Jenny, H.C.

- Ph.D. Management Science,
  National Chiao Tung University
- Master: Public Health
  National Taiwan University
- Special Research: Climate Change and development
  Harvard University
- Assistant Professor in NCU, NTUT
- Executive Director, GHG Office
- Environmental Protection Administration (EPA), Taiwan

On reaching a climate agreement, Hui-Chen Chien, Taiwan Environmental Protection Administration, cautioned: "the longer we wait to take action, the more our future will pay!"



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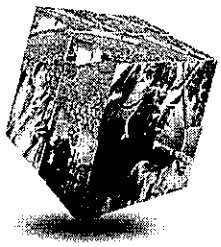
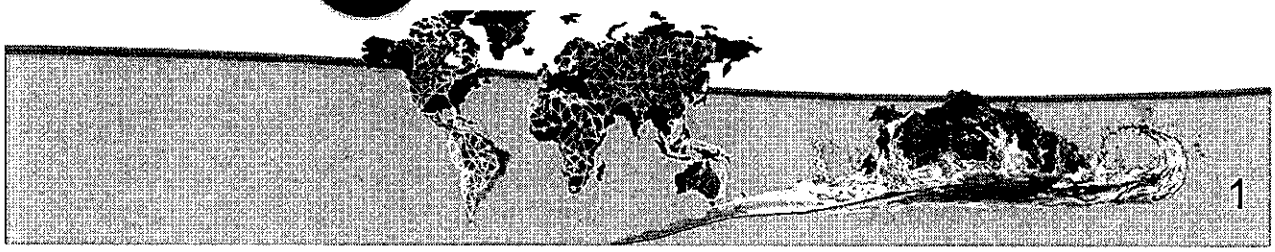
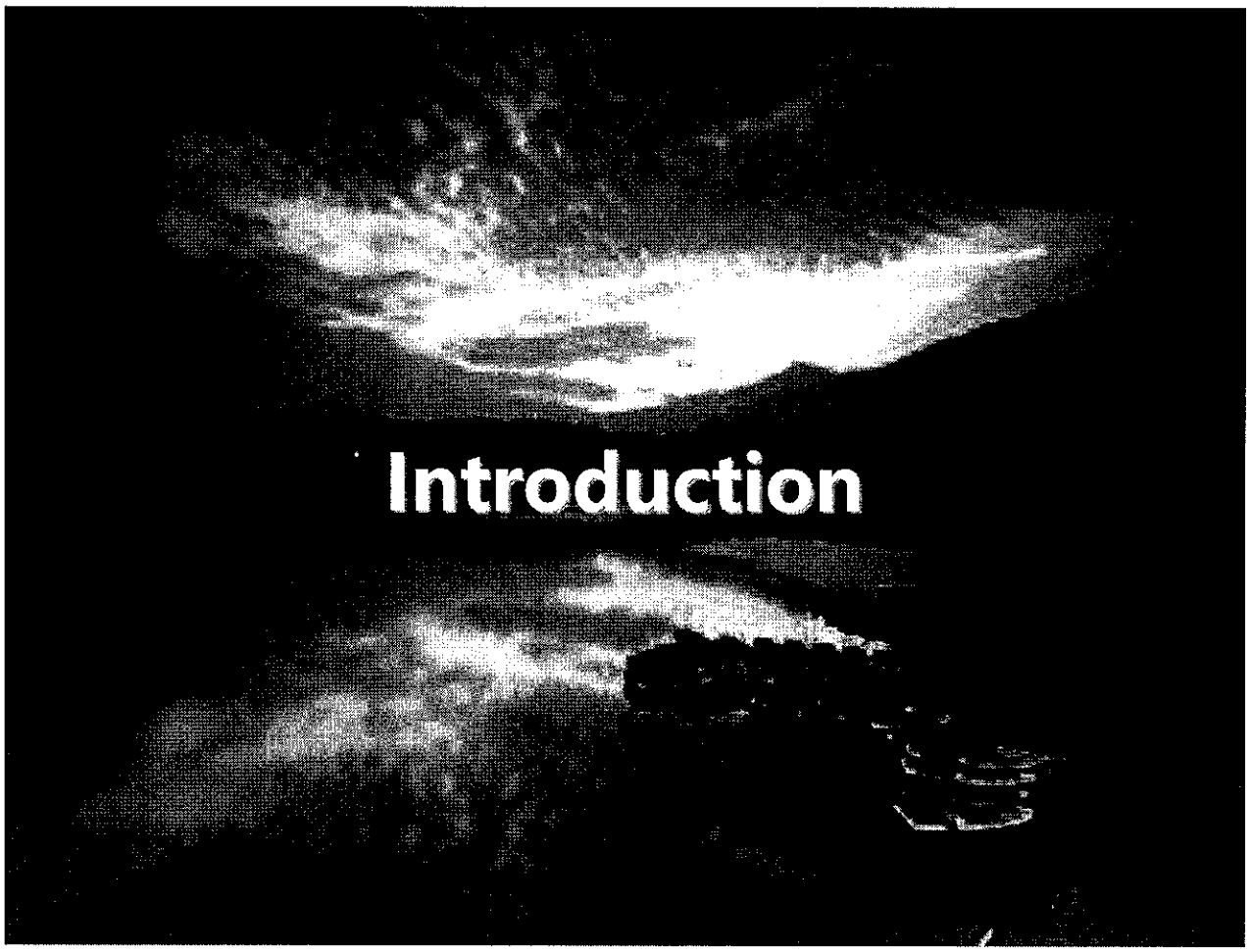
Outline



1. Introduction
2. Background of Pan Pacific Adaptation on Climate Change (PPACC)
3. PPACC's Achievement during 2014-2016
4. PPACC's Work plan of 2016
5. Conclusions





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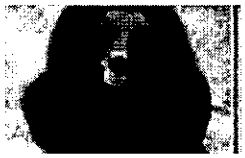
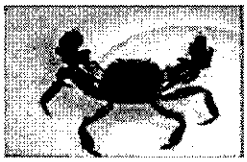
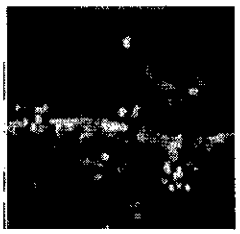
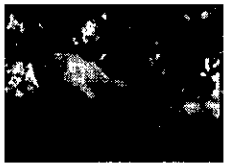
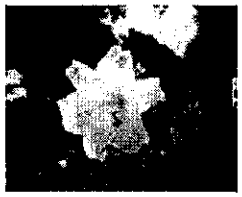
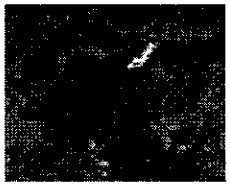
Beautiful Formosa

Vulnerable Island with Rich Biodiversity



Area: 36,000 square kilometers

Population: 23 million

Steep topography:

- 36,000 km^2 with Jade Mountain close to 4,000m. Covers both the tropical and subtropical zones

Rich biodiversity:

- 50,000 species, 1.5% of the world
- one-third is endemic

Unpredictable Weather Impacts

Every year Taiwan experiences:

- Monsoon transition
- 3-4 typhoon hits
- Drought/Extreme rainfall
  - Annual rainfall: 1718- 4863mm
  - 1 hr maximum rainfall: 190mm
  - 24 hrs maximum rainfall: 1749mm
  - 48 hrs maximum rainfall: 2361mm
- 42 days over 35°C *(heat wave)*
- Pollutants transport from Asia

Natural Disasters : Typhoons, landslides, floods, and earthquakes.
Taiwan is facing serious challenges from the changing climates.

Adaptation Policy in Taiwan

Scientific Assessment of Climate Change

(Ministry of Science and Technology)

Consortium for Climate Change Study (CCliCS)

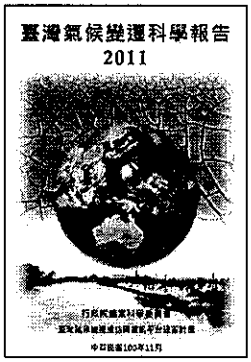
↓

The Taiwan Climate Change Projection and Information Platform Project (TCCIP)

↓

Taiwan integrated research program on Climate Change Adaptation Technology (TaiCCAT)

→

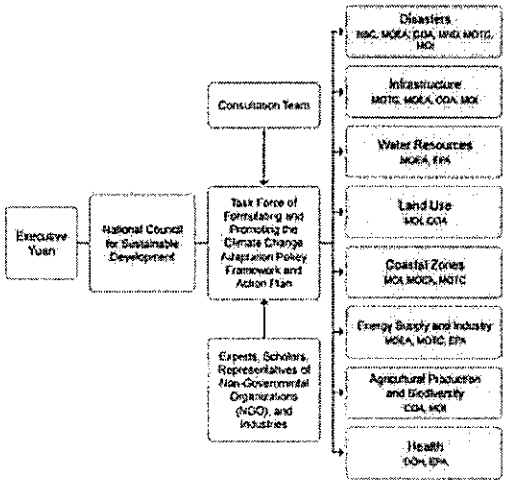


Climate Change in Taiwan: Scientific Report 2011

→

Adaptation Strategy to Climate changes in Taiwan

(National Development Council)



The Organization of the National Adaptation Policy Framework

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Taiwan's Carbon Reduction Legislations

Mitigation

- Energy Management Act
- Renewable Energy Development Act
- GHG Reduction and Management Act
- Energy Tax Act (drafting)

Adaptation

Strategic Framework on Climate Change Adaptation

- Disasters
- Agriculture
- Energy Sector
- Water Resources
- Coastal Areas
- Health
- Biodiversity
- Infrastructure
- Land Use

行政院環境保護署

GHG Reduction and Management Act

Target: 50% below 2005 level by 2050

GHG Reduction Implementation Program

Performance Standards

Offset Project

Cap & Trade

National Climate Change Framework

GHG Reduction and Management Act

- Mitigation
- Adaptation
- Green Growth

Requires relevant central government agencies to implement adaptation actions

Encourage, incentives and reward

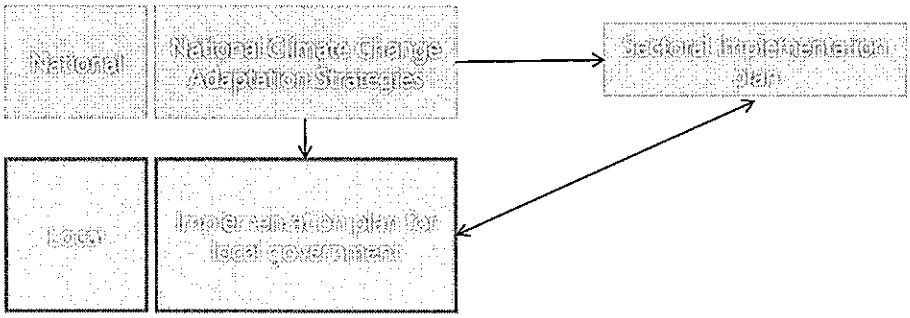
Boost the efficiency of resource and energy use

Development of renewables

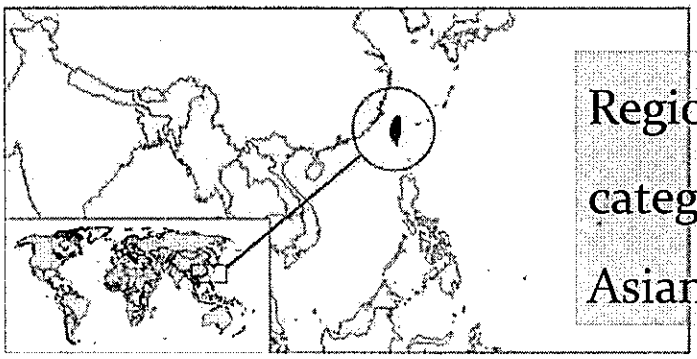
Adaptation under GHG Reduction and Management Act

Legal Basis: According to the Article 8, 13, 19, 27 of the GHG Act

Relevant central government agencies shall promote climate change adaptation through the following actions and implementation and compilation of the work of GHG reduction and climate change adaptation. Climate change adaptation strategies, and regularly submit survey, statistics, and adaptation results to the central competent authority annually.

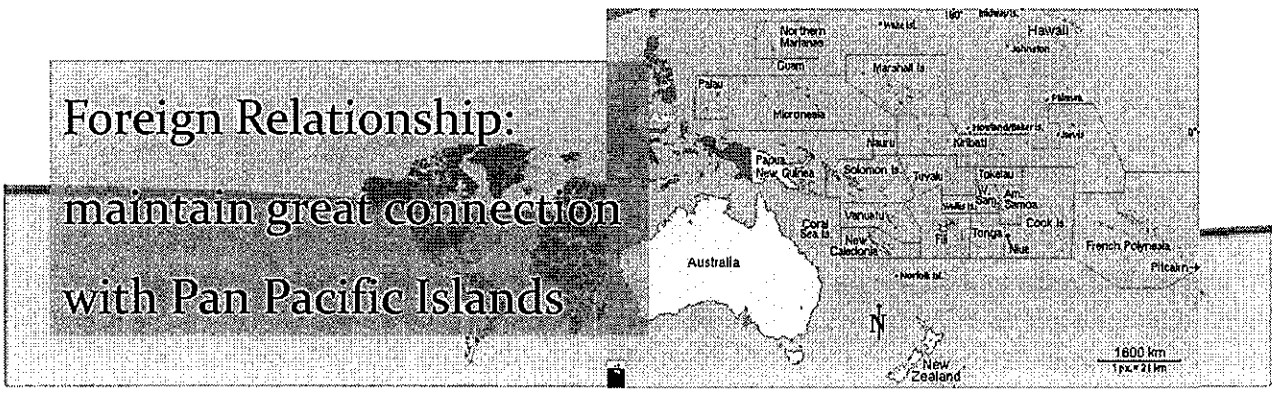


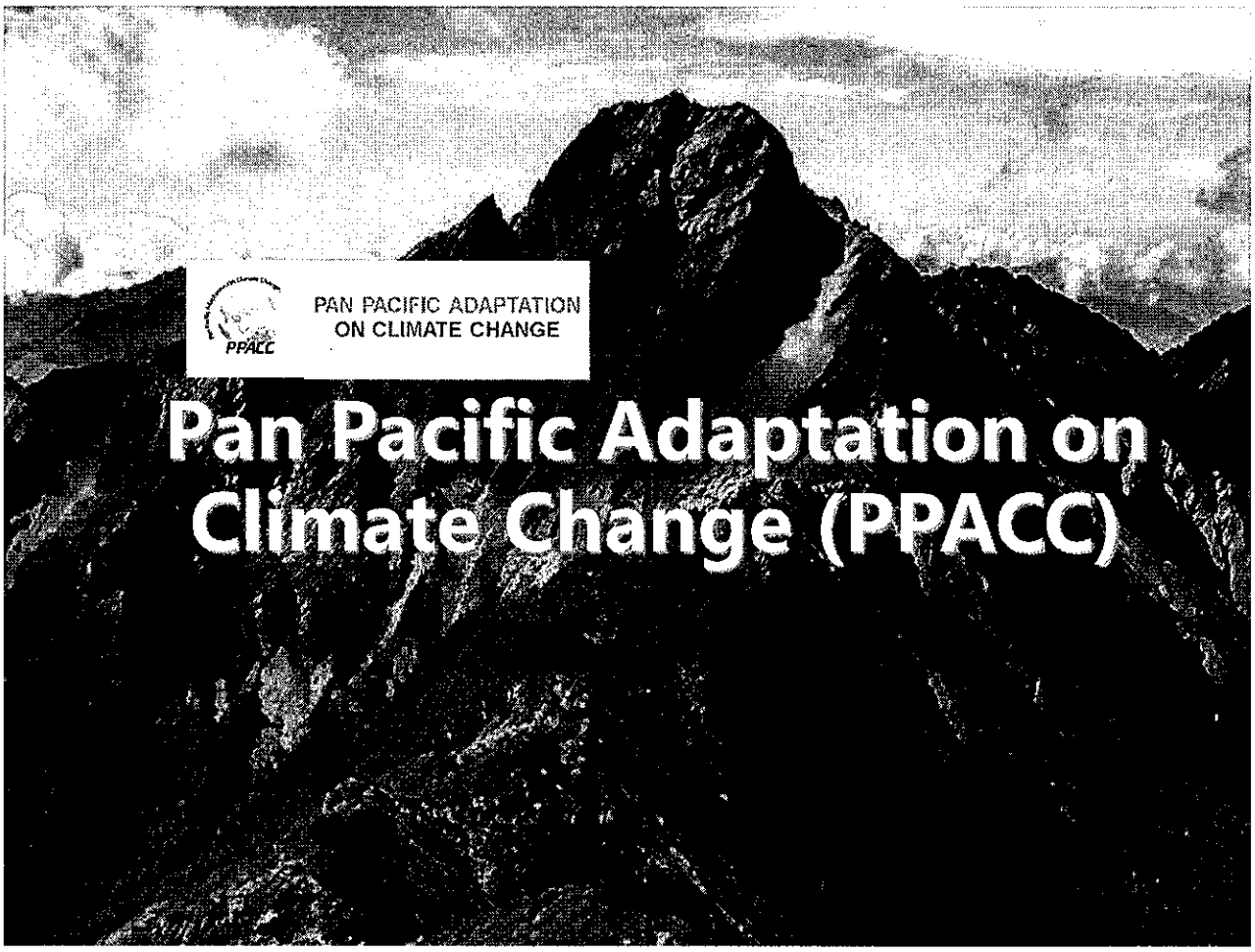
Taiwan's Global Role in Climate Action



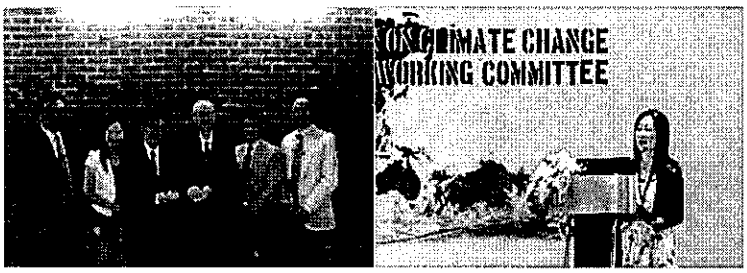
Regional Geography: categorized as an East Asian country

Foreign Relationship: maintain great connection with Pan Pacific Islands





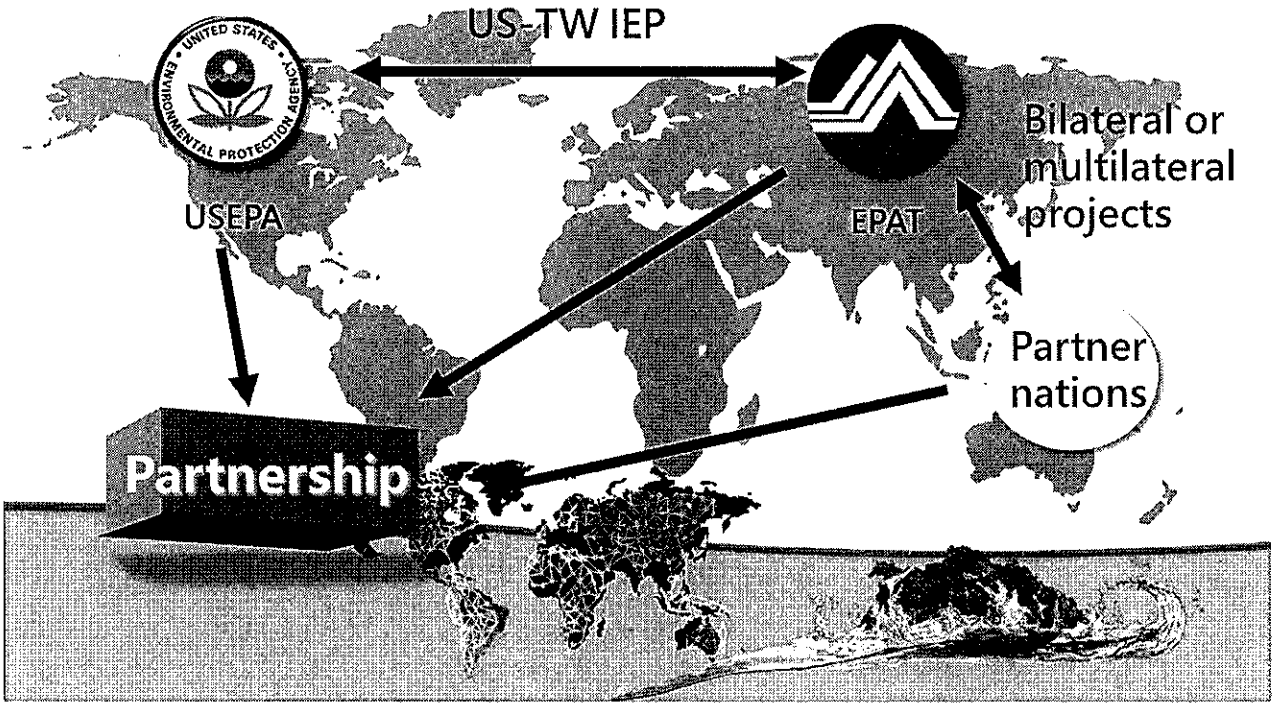
Background of PPACC



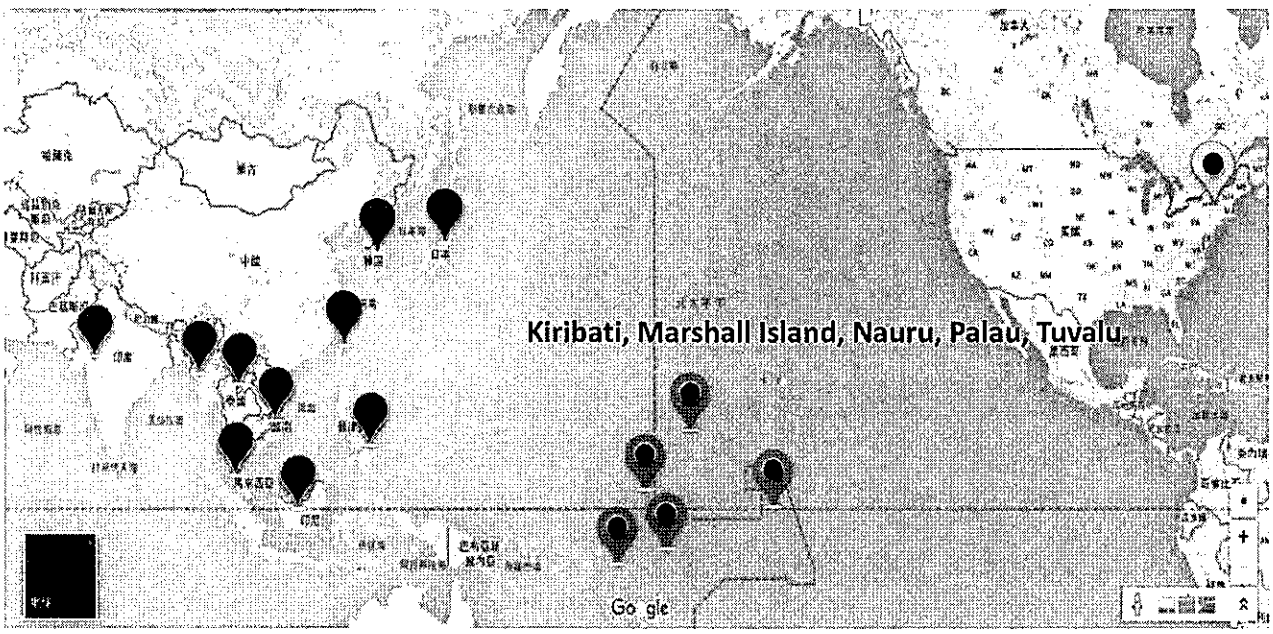
Since 2014, Taiwan Environmental Protection Administration (EPAT) has launched cooperation with the U.S. Environmental Protection Agency (USEPA) through the International Environmental Partnership (IEP) program.

In the year of 2014 and 2015, the two authorities co-hosted international conferences on climate change adaptation, involving with participants from East Asian states, Pan Pacific Island states, and USA experts and scholars, and international NGOs

PPACC:
Extending from Bilateral to Partnership



PPACC: Participants from around the World



Southeast Asia

Northeast Asia

Pan Pacific

USA

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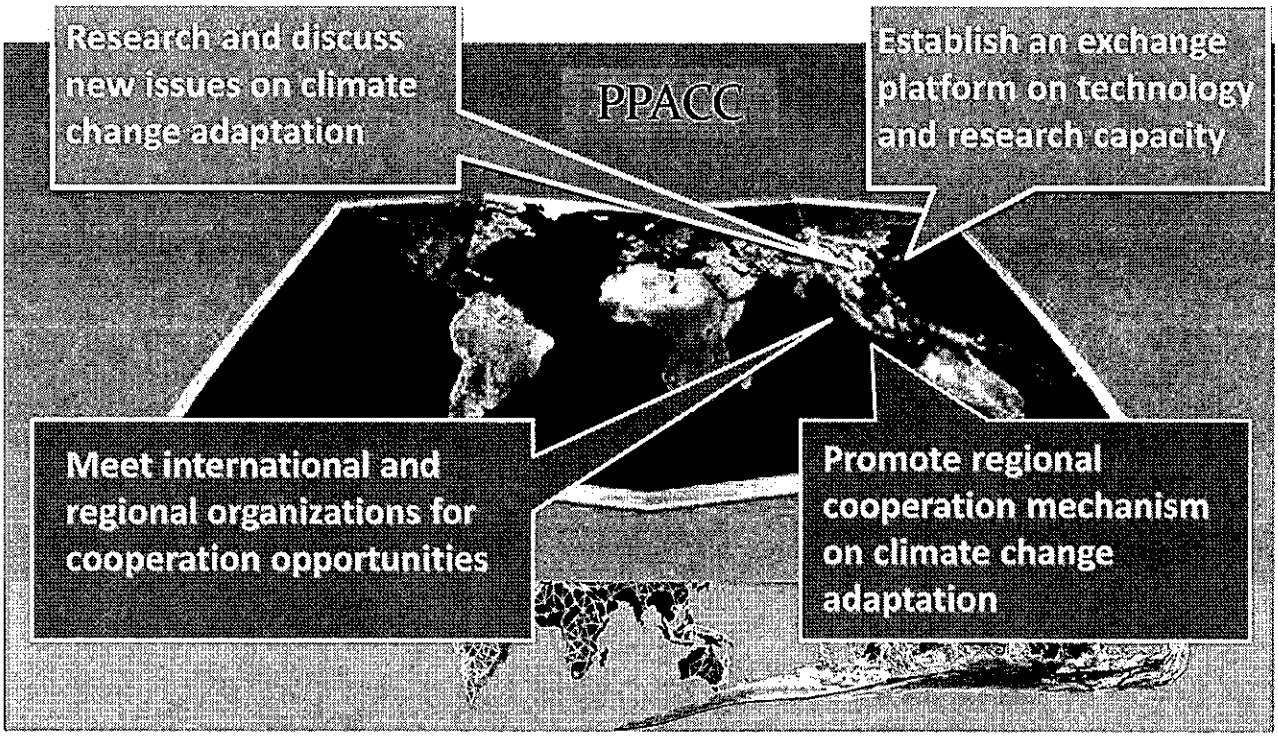
Regional Adaptation Network Goals



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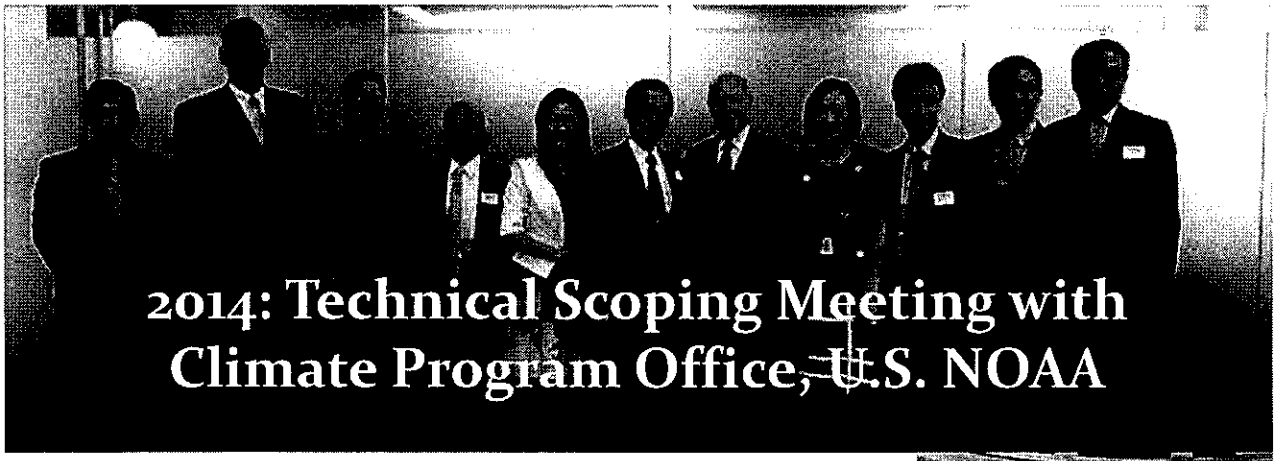
2. PPACC's Achievement during 2014 - 2016



2014: Technical Scoping Meeting with Climate Program Office, U.S. NOAA

- Near Term: technical cooperation, knowledge Sharing Platforms
- Next steps: Collaboration of U.S. Climate Resilience Toolkit.
  - Pan Pacific: Include presentation of the U.S. Climate Resilience Toolkit as part of a broader discussion of existing national and regional knowledge sharing platforms. If there is interest by the Partnership, focused areas of cooperation could be identified.
  - Coastal Resilience
  - Health

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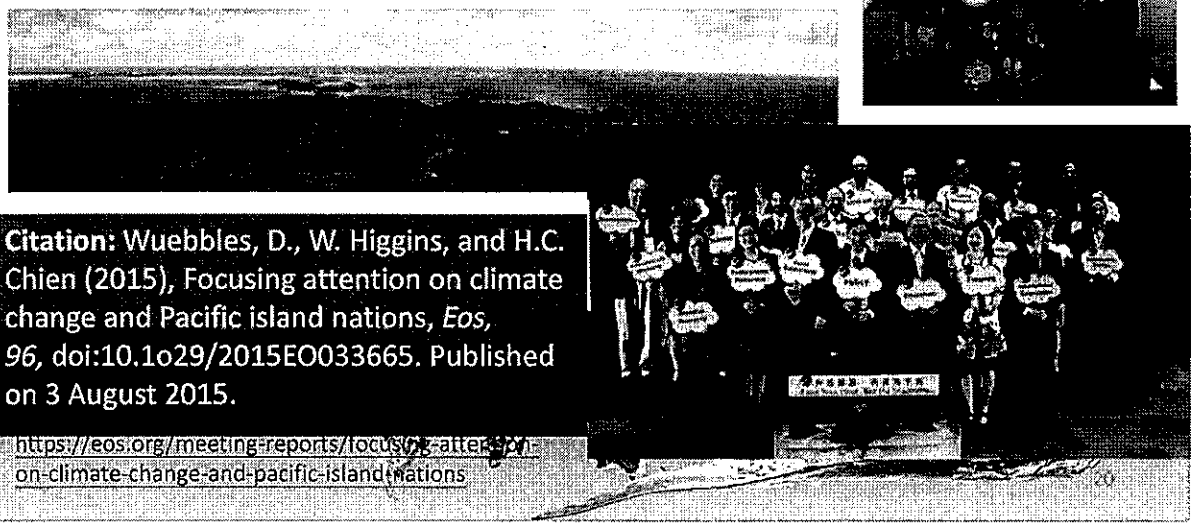
2014: 1st PPACC Conference, Taipei

Focusing Attention on Climate Change and Pacific Island Nations

The 2014 Pan Pacific Partnership on Climate Change Adaptation; Taipei, Taiwan, 29 September to 2 October 2014



Citation: Wuebbles, D., W. Higgins, and H.C. Chien (2015), Focusing attention on climate change and Pacific island nations, *Eos, 96,* doi:10.1029/2015EO033665. Published on 3 August 2015.

https://eos.org/meeting-reports/focusing-attention-on-climate-change-and-pacific-island-nations

2015: 2nd PPACC Conference, Hanoi

- Establish a platform for information sharing, experience exchanging, and tools developing on climate change adaptation.
- Incubate bilateral and multilateral projects based on concrete objectives and collaborative tasks under the IEP structure.
- Build up a more comprehensive partnership among the participants.

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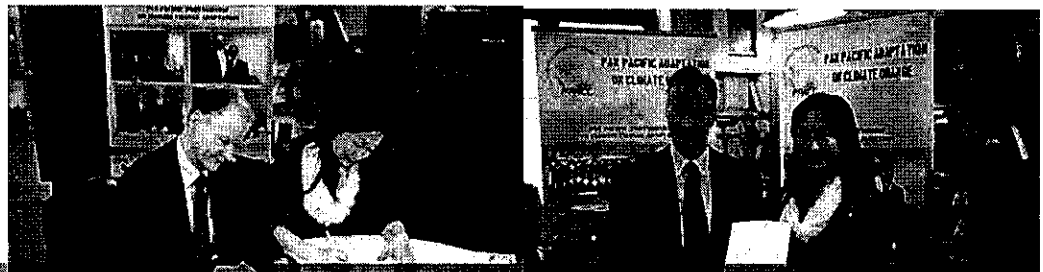

2015: Collaboration with MIT CCI to launch the Climate Colab Project

2015: Reunion in Paris-PPACC with COP21

2016: Collaboration with Korea University

PROACTIVE KU BK21 PLUS ELEC

PPACC PAN PACIFIC ADAPTATION ON CLIMATE CHANGE

PPACC and BK21Plus ELEC herewith agree to collaborate in Research and Education for Climate Change Adaptation in Pan Pacific and Mid-Latitude Region, including "Model Development for Assessing Vulnerability of Forest and Agricultural Sectors to Climate Change" of MOTIVE (Model Of integrated Impact and Vulnerability Evaluation) project.

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Achievements and Future work

2014-15 → 2016-17

Consensus building

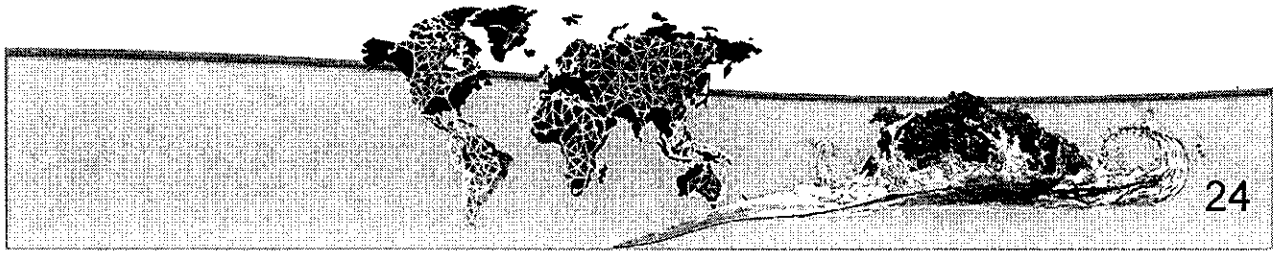
- Workshop and forum on Climate Change Adaptation
- Multilateral consensus building meeting
- Bilateral joint implementation projects

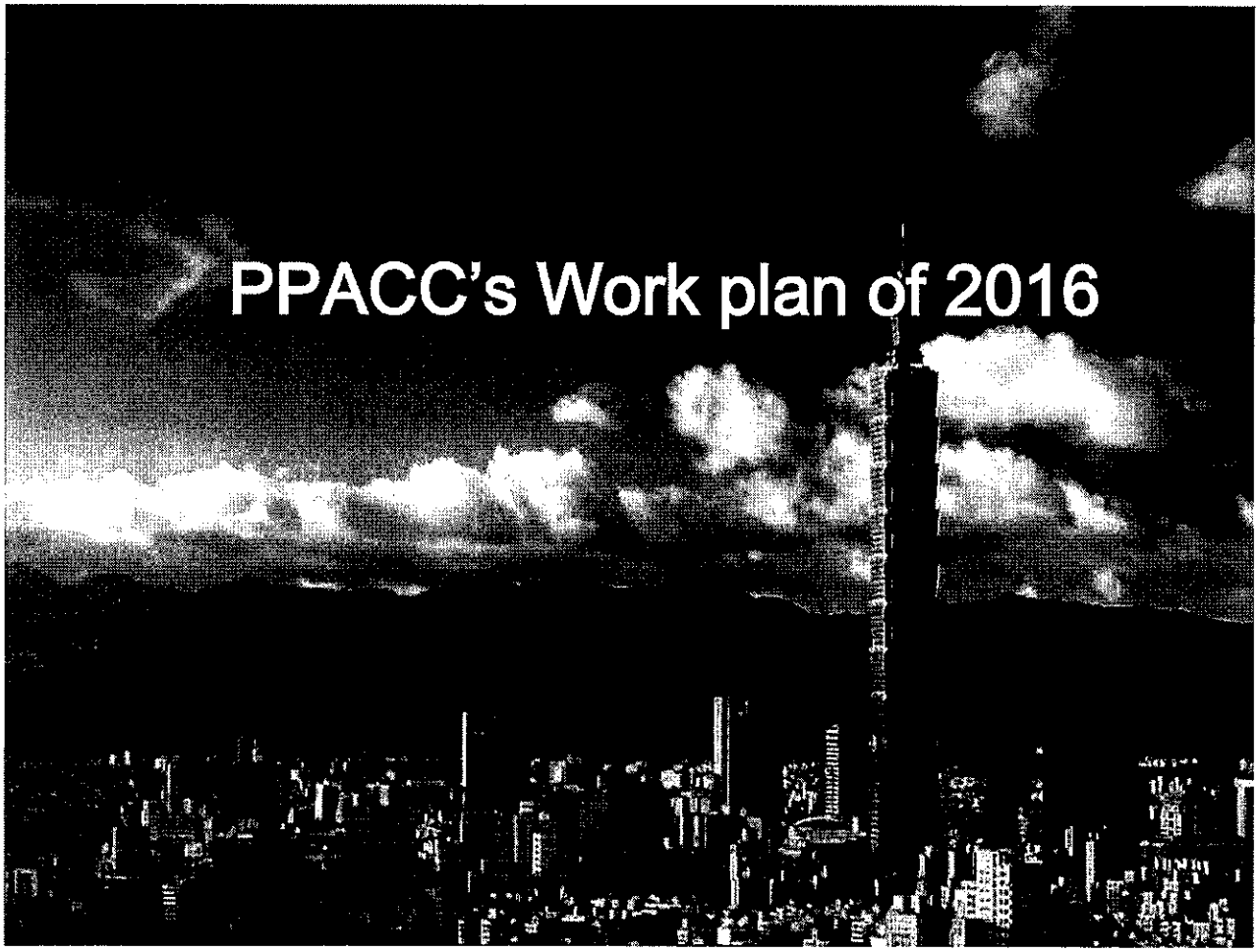
Partnership platform

- Construction and inception
- International non-governmental organization (INGO)
- Multilateral joint implementation projects

Regional adaptation network

- Adaptation Network on Climate Change
- An exchange platform for climate information





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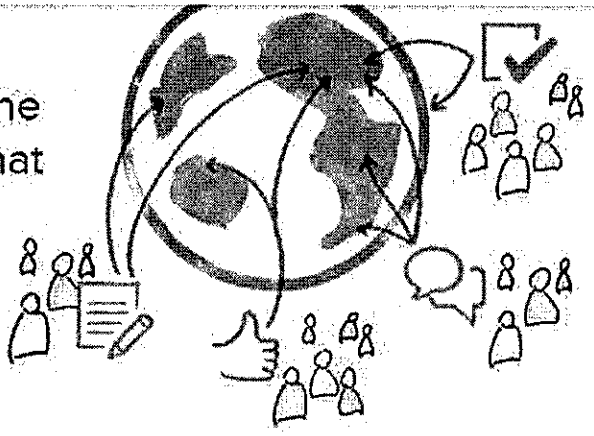
MIT Center for Collective Intelligence

2016 Work plan: Climate Colab Platform

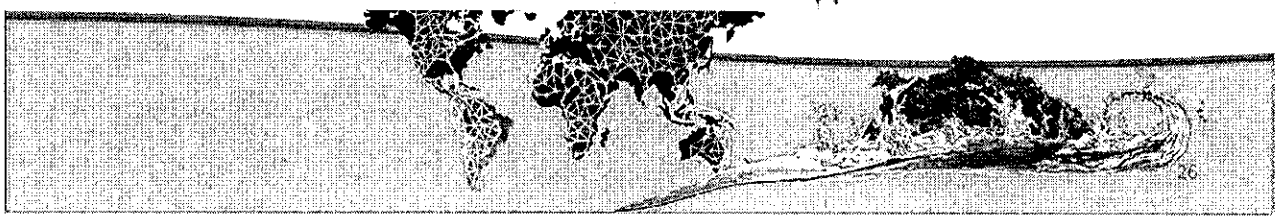
In the Climate CoLab, you can work with people from all over the world to create proposals for what to do about climate change.

LEARN MORE | GET INVOLVED



The Climate CoLab is a project of the MIT Center for Collective Intelligence in collaboration with many other organizations

Climate CoLab Winners



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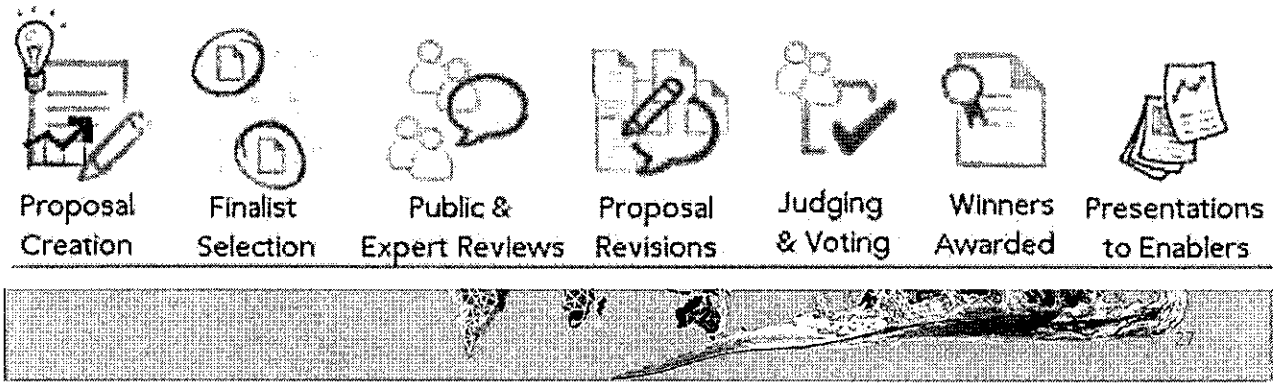
MIT Center for Collective Intelligence

2016 Work plan: Climate Colab Contest

- MIT CCI will provide the platform and online tools to run contests involving climate innovative solution by collective intelligence. MIT CCI will also provide necessary guidance and implement the contests together with PPACC.
- PPACC will organize a team for each contest to develop the contest materials, and oversee and coordinate the contests.



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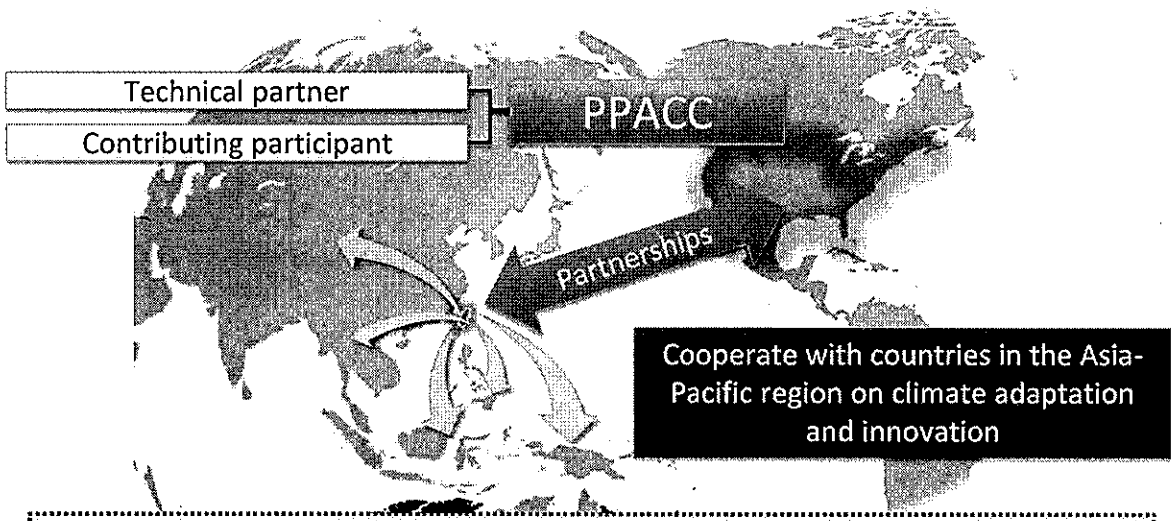
Environmental Protection Administration
Executive Yuan, R.O.C. (Taiwan)

2016 Work plan: 3rd PPACC Conference

Goal

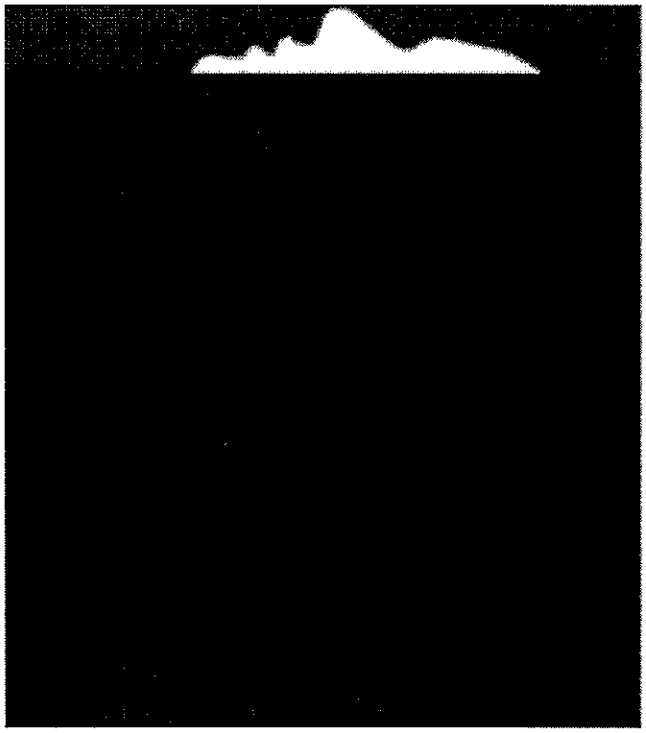
- Reunite with the participants of the previous conferences and making progress of the partnership.
- Launch NOAA's climate change resilience toolkit training (progress/experience sharing) course.
- Present the outcome of Climate Colab IEP project collaborated by MIT CCI and EPAT.
- Incubate bilateral and multilateral projects based on concrete objectives and collaborative tasks under the IEP structure.

Conclusions



- Continued cooperation among the PPACC members
- Transfer knowledge and skills to Asia-Pacific nations
- Strengthen the partnership with the structure of an INGO
- Incubate bilateral and/or multilateral collaborative projects through PPACC

Thank you for your attention!



IIASA

KOREA UNIVERSITY BK21PLUS ELEC

The 3rd IIASA-KU Workshop for Mid-Latitude R/D Network

Systems Analysis Approach to Climate Change Adaptation and Mitigation
for Mid-Latitude Ecotone in connection with EU-Horizon 2020 Strategies

Date: 16th - 17th March 2016
Time: 16th (13:30 – 18:00), 17th (9:30 – 20:00)
Venue: Multi-media room in Hana-Square, Korea University

Preamble

It is clear that we have confronted with grave challenges to solve the conflicts of climate change, biodiversity and energy shortage and to achieve sustainable development on global and regional scale.

An adaptation approach to climate change requires better knowledge of regions and processes, and research findings should be directed in a way to enhance in adaptive strategies against climate change. Such researches and proposing of policies regarding climate change should concentrate on improving regional understandings.
The Mid-Latitude zone can be broadly defined as part of the northern hemisphere between 30°-60° latitude. In terms of demographics and level of economic development in the Mid-Latitude region, approximately 50% of the world population lives in this region, and the scope of research are adjusted to the area particularly between 20°N - 40°N. The Mid-latitude zone is regarded vulnerable to climate; even small changes of climatic indicators (temperature, precipitation) may provide substantial impacts on ecosystems in this zone because the land cover of a number of countries in Mid-Latitude are comprised mostly of arid or semi-arid area. Therefore, we have to expand our knowledge of environment of the Mid-Latitude through continuous research and investigation.

In May 2015, we had 1st international workshop for Mid-Latitude in Seoul and built international R/D Network for Mid-Latitude as well as Korean Industry & Academy Cooperation for Mid-Latitude R&D Initiative.
Through the Side Event (2nd Mid-Latitude workshop) at Korea Pavilion of COP21 in 2015, Paris, we shared ideas for climate change and spatial resilience across the Mid-Latitudes. It will contribute to build framework for climate change mitigation, adaptation, and sustainable development.

Through our 3rd workshop for Mid-Latitude, the followings are expected to be managed; 1) Setting and developing the research scope, area and time plan for the EU-Horizon 2020 project, 2) finding of cooperative possibility with each international organizations, 3) investigation of action plans for the Mid-Latitude research by the Young Scholar Committee (initiated by the BK21Plus Eco-Leader Education Center (ELEC) for wise adaptation to climate and environment changes in 2015). Furthermore, future plans will be arranged with IIASA to prepare the proposal document for the EU-Horizon2020.

DAY 1 : Preparatory Meeting for the 3rd Workshop and EU-Horizon 2020 Proposal			
Place: East Bldg #224, College of Life Science, Korea University			
Time		**Duration**	**Activities**
12:00	13:15	1h 15m	Lunch
13:30	18:00	4h 30m	- Moderator: *Prof. Woo-Kyun LEE (Korea University)* - Preparation Meeting for the 3rd Workshop and EU-Horizon 2020 Proposal - Participants: BK21Plus ELEC Professors and foreign participants
18:30	20:00	1h 30m	Dinner

Day 2 : Systems Analysis Approach to Climate Change Adaptation and Mitigation for Mid-Latitude Ecotone in connection with EU-Horizon 2020 Strategies			
Place: Multi-media room in Hana-Square, Korea University			
Time		**Duration**	**Activities**
09:30	10:00	30m	Registration
10:00	10:50	50m	1st Session (4 Presentations) by Young Scholar Committee - *Moderator: Prof. Seongwoo JEON (Korea University)/ Ms. Jooyeon MOON (ML-YSC Chair, Korea University)* - *Ms. Seajin Kim (Master Course, ML-YSC member)* - *Mr. Seongbong HEO (Master course, ML-YSC member)* - *Mr. Chul-Hee LIM (Ph.D. student, ML-YSC member)* - *Mr. Jongyeol LEE (Ph.D. student, ML-YSC member)*
10:50	11:00	10m	Break
11:00	11:30	30m	Opening Ceremony - *Moderator: Prof. Woo-Kyun LEE (Korea University)* - Opening Remarks (*Prof. Dr. Jeong-Kyu KIM, Director General, OJERI, Korea University*) (5min) - Welcoming Remarks (*Prof. Dr. Ick Young KIM, Dean, College of Life Sciences and Biotechnology, Korea University*) (5min) - Congratulatory Remarks (*Prof. Dr. Pavel KABAT, Director General, IIASA, Austria*) (5min) - Vision of OJeong Eco-Resilience Institute (*Prof. Jeong-Gyu KIM, Director General, OJERI, Korea University*) (15min)
11:30	12:00	30m	1st Session (2 Presentations) by Young Scholar Committee - *Moderator: Ms. Jooyeon MOON (ML-YSC Chair, Korea University)* - *Ms. Jooyeon MOON (Master course, ML-YSC member)* - *Mr. Cholho SONG (Ph.D. student, ML-YSC member)*

Time		Duration	Activities
12:00	13:00	1h	Lunch Break
13:00	15:00	2h	2nd Session : Contents of EU-Horizon 2020 - *Moderator: Prof. Seongwoo JEON (Korea University)* - *Prof. Woo-Kyun LEE (Korea University)* - *Ms. Ju Young KIM (EU Delegation to Korea)* - *Dr. Florian KRAXNER (IIASA)* - *Dr. Anatoly SHVIDENKO (IIASA)* - *Prof. Petro LAKYDA (NUBIP)* - *Prof. Seung Hee KIM (Chapman University)*
15:00	15:20	20m	Coffee Break
15:20	18:00	2h 40m	3rd Session : Networking of EU-Horizon 2020 - *Moderator: Prof. Jinhyung JEON (Korea University)* - *Dr. Hui-Chen CHIEN (PPACC)* - *Dr. Chi-Ming PENG (WeatherRisk Explore Inc.)* - *Ms. Taniya KOSWATTA (APN)* - *Prof. Yowhan SON (GCP Korea Office)* - *Mr. Artemy IZMESTIEV (UNDP, Seoul Policy Centre)* - *Dr. Bernhard SELIGER (Hanns Seidel Foundation)* - *Dr. Jong-Soo YOON (UN-OSD)*
18:00	18:30	30m	Discussion *(Moderator: Prof. Yowhan SON, Prof. Woo-Kyun LEE)*
18:30	20:30	2h	Dinner

Participants

<Session 1>

Mid-Latitude Young Scholar Committee (YSC) members from BK21Plus ELEC
- Ms. Seajin KIM (bluegulcy@gmail.com)
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<Session 2>

1. Korea University
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2. European Commission – EU Delegation to Korea
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4. Education and Research Institute of Forestry and Landscape Park Management, National University of Life and Environmental Sciences of Ukraine
   - Prof. Petro LAKYDA (lakyda@nubip.edu.ua)

5. Chapman University
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<Session 3>

1. PPACC (Pan-Pacific Adaptation to Climate Change, Taiwan)
   - Dr. Hui-Chen CHIEN (hcchien200@gmail.com)

3. WeatherRisk Explore Inc.
   - Dr. Chi-Ming PENG (climatechange.tw2014@gmail.com,peng@weatherrisk.com)

3. APN (Asia-Pacific Network for Global Change Research)
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4. GCP Korea Office (Global Carbon project, Korea)
   - Prof. Yowhan SON (yson@korea.ac.kr)

5. UNDP (United Nations Development Programme/UNDP Seoul Policy Centre)
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6. Hanns Seidel Foundation
   - Dr. Bernhard SELIGER (seliger@hss.or.kr)

7. UN-OSD (UN-Office of Sustainable Development, Korea)
   - Dr. Jong-Soo YOON (yoonj@un.org)

8. OJERI (OJeong Eco-Resilience Institute, Korea)
   - Prof. Jeong-Gyu KIM (lemonkiim@korea.ac.kr)

Hosted by

- BK21Plus Eco-leader Education Center for wise adaptation to climate change (BK21Plus ELEC), Korea University
- OJERI (OJeong Eco-Resilience Institute)
- GCP Korea Office (Global Carbon Project)
- IIASA-ESM (International Institute of Applied Systems Analysis - Ecosystems Services & Management)

Organized by

- Mid-Latitude R/D Network
- Environment GIS/RS Center

Sponsored by

- College of Life Sciences and Biotechnology, Korea University
- NRF (National Research Foundation of Korea)
- IIASA (International Institute of Applied Systems)
- MOTIVE (Model Of inTegrated (Climate Change) Impact and Vulnerability Evaluation)

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