

國立臺北大學自然資源與環境管理研究所  
106 學年度第一學期『環境工程科學概論』

課程講義(06)：風險評估概要  
Introduction to Risk Assessment

● INTRODUCTION

- Violation of Exceeding the Standards vs. Probability of Exceedance (超越頻率)
- Hazard, Risk, and Disaster/Catastrophe (危害、危機 / 風險、災害 / 巨災)
- Risk Analysis, Risk Assessment, and Risk Management
- Quantitative Assessment, Qualitative Description and Comparative Ranking:  
=> Subjective Ranking of Activities and Techniques (Hazards)
- Health Risks, Environmental/Ecological Risk, and Socio-Economic Risks
- Adaptation of Climate Change: Risk = f(Vulnerability, Exposure, Hazards)

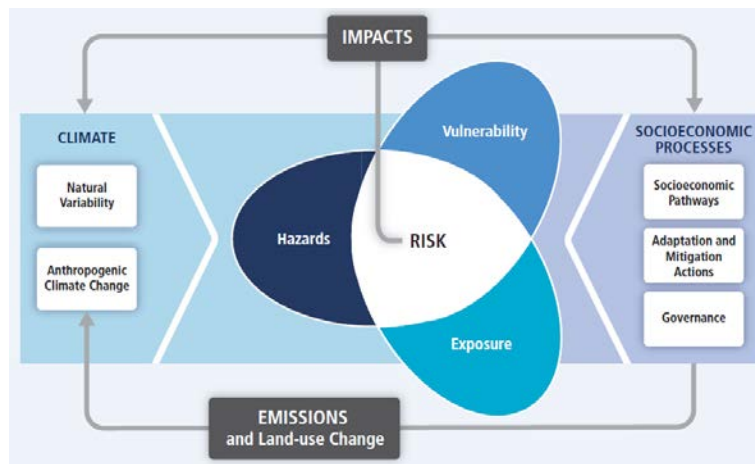
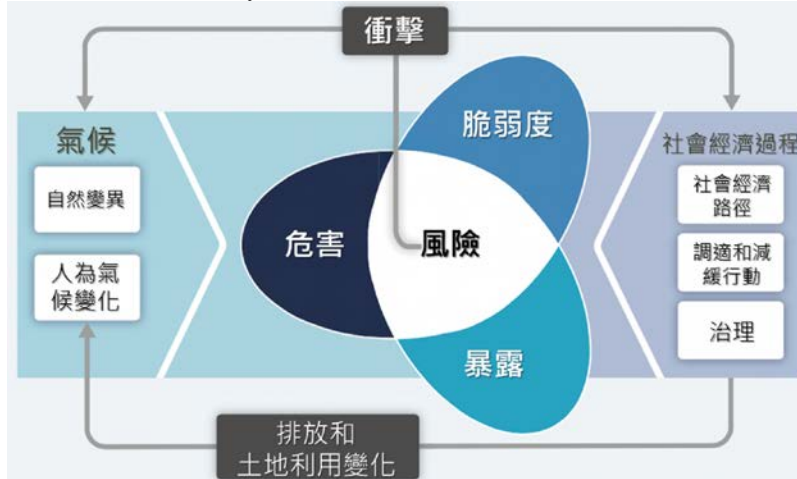


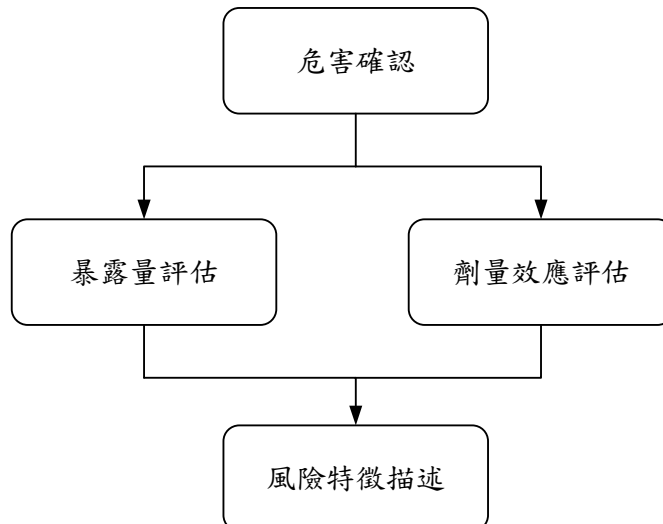
Figure SPM.1 Illustration of the core concepts of the WGII AR5. Risk of climate-related impacts results from the interaction of climate-related hazards (including hazardous events and trends) with the vulnerability and exposure of human and natural systems. Changes in both the climate system (left) and socioeconomic processes including adaptation and mitigation (right) are drivers of hazards, exposure, and vulnerability. ([http://ipcc-wg2.gov/AR5/images/uploads/WG2AR5\\_SPM\\_FINAL.pdf](http://ipcc-wg2.gov/AR5/images/uploads/WG2AR5_SPM_FINAL.pdf))



(中文翻譯 <http://sdl.ae.ntu.edu.tw/TaiCATS/building.php?id=7>)

## ● HEALTH RISK ASSESSMENT: FOUR STAGES

- Hazard Identification 危害確認：包括危害性化學物質種類、危害性化學物質之毒性（致癌性、包括致畸胎性及生殖能力受損之生殖毒性、生長發育毒性、致突變性、系統毒性）、危害性化學物質釋放源、危害性化學物質釋放途徑、危害性化學物質釋放量之確認。
- Dose-Response Assessment 劑量效應評估：致癌性危害性化學物質應說明其致癌斜率因子，非致癌性危害性化學物質應說明其參考劑量、基標劑量或參考濃度。
- Exposure Assessment 暴露量評估：進行開發活動於營運階段所釋放危害性化學物質經擴散後，經由各種介質及各種暴露途徑進入影響範圍內居民體內之總暴露劑量評估。
- Risk Characterization 風險特徵描述：依據前三項之結果加以綜合計算推估，開發活動影響範圍內居民暴露各種危害性化學物質之總致癌及總非致癌風險，總非致癌風險以危害指標表示不得高於 1；總致癌風險高於  $10^{-6}$  時，開發單位應提出最佳可行風險管理策略，並經環境影響評估審查委員會審查。風險估算應進行不確定性分析，並以 95% 上限值為判定基準值。



## ● RISK PERCEPTION AND RISK MANAGEMENT

- “Perception is Reality” => Perception vs. Cognition
- Stakeholders and Interested Parties
- Description of Risks for Human Lives => Live vs. Health
- Issues related to Environmental Impact Assessment
  - => Wind Power and Fine Particles
  - => Emerging Risk vs. Existing Threats
- Risk Communication => Acceptable Risk, Cumulative Risk, Incremental Risk

## ● HOMEWORK ASSIGNMENT #2 (2017/10/31 Due) :

1. 請下載、閱讀「[健康風險評估技術規範](#)」，並應用電腦軟體（如 Microsoft Visio）繪製該規範所之風險評估流程圖。
2. 請討論空氣污染之細懸浮微粒 PM<sub>2.5</sub> 可否界定為「危害性化學物質」，進而成為環境影響評估之健康風險評估對象。