出國報告（出國類別：會議）

出席「2012 年第 10 屆生態平衡國際研討會」擔任主持人及發表論文

服務機關：國立臺北大學/自然資源與環境管理研究所
姓名職稱：王彬墀
博士三年級研究生
派赴國家：日本
出國期間：101 年 11 月 20 日至 11 月 24 日
報告日期：101 年 11 月 26 日

一、 目的

本次出國目的係出席 EcoBalance 2012-The 10th International Conference on EcoBalance (2012 年第 10 屆生態平衡國際研討會)，擔任該會議 Sustainability Index and Case Study(永續性指標與案例研究)第一、二場次之 Session Chair 及發表所撰論文"Comparison and Integration of Human Dimension's Indicators for Welfare and Happiness"(有關福祉與幸福之人文面向指標的比較與整合)。生態平衡國際研討會係由 The Institute of Life Cycle Assessment, Japan (iLCAj/日本生命週期評估學會)策劃籌辦，於 1994 年在日本筑波市舉辦首屆大會以來，每兩年舉辦一次，前 7 屆均在筑波舉辦，第 8 及 9 屆於東京舉辦；今年在橫濱市舉辦第 10 屆大會，由日本 Keio University(慶應義塾大學)主辦，主題是"Challenges and Solutions for Sustainable Society"(永續社會之挑戰與解決之道)。

二、 過程

是次會議於 2012 年 11 月 20 日至 11 月 23 日在日本慶應義塾大學位於神奈川縣橫濱市日吉校區協生館二樓舉辦(主場地 A：藤原洋紀念廳、場地 B：第一多目標教室、場地 C：第二多目標教室、場地 D：第三多目標教室以及海報發表場地：活動大廳)。11 月 20 日主係大會歡迎晚會，11 月 21 日至 11 月 23 日則為正式大會期間；大會期間除邀請全球各地講者進行專題演講、各場次論文口頭發表外，並於 11 月 22 日下午舉辦研究成果海報發表活動。行政院環境保護署環檢所阮國棟所長亦受邀於 11 月 21 日場地 B(第一多目標教室)進行專題演講，講題是：「事業與工業廢水之磷回收技術：台灣的觀點」，在 11 月 20 日大會歡迎晚會上，學生亦與阮所長暢談相關議題、並交換心得。

觀諸大會提供資料共有 139 篇口頭發表論文、近 200 篇海報發表研究成果或論文。

口頭發表論文區分 Special sessions 與 General sessions，茲分述如下；

【Special sessions】

S1: Sustainability Index and Case Study

S2: Recent Progress in Material Flow Analysis and Sustainable Resource Management

S3: Renewable Energy for Sustainable Development

S4: Water Footprint

S5: Sustainable agriculture and food toward globalizing Asia

S6: Environmental Management Accounting

S7: Sustainable Nutrient Management

S8: Materials technology for resource sustainability

【General sessions】

G1: Input-output analysis

G2: Impact assessment, risk assessment and interpretation

G3: Footprint methodology

G4: Sustainable Management

G5: Design and management for the environment

G6: International cooperation and LCA database

G7: Sociology, psychology and education

G8: New challenges in management of supply chain

G9: Waste management and recycling

大會開幕式除由大會主席 Ikaga 簡介籌辦過程、生命週期評估大師級教授 Inaba 介紹大會歷史沿革，並安排兩場開幕演講；邀請日本內閣辦公室特別顧問 Dr. Hiroto Izumi、日產汽車公司 Mr. Youichi Kishimoto，分就 "Future City Initiative"及"The Future Created by EV Comes in view-EV Marketplace Acceptance and its Future Prospects as Social System"為題進行演說。

學生本次口頭發表論文題目：「Comparison and Integration of Human Dimension's Indicators for Welfare and Happiness/有關福祉與幸福之人文面向指標的比較與整合」，大會安排在主場地 A(藤原洋紀念廳)「永續性指標與案例研究」首場次的第三位進行發表 (S1-3)。該文係考量國際社會為探究及試圖衡量人類於物質生活和精神生活之間如何保持平衡，進而發展多種人文指標加以評量。其目的主係針對人文面向指標有關福祉與幸福指數者，進行比較與整合；包括著眼所得分配均等與否的程度的吉尼指數(GINI Index)或吉尼係數(GINI coefficient)、聯合國開發計劃署的「人類發展指數」(Human Development Index, HDI)、不丹王國的「國民幸福指數」(Gross National Happiness, GNH)及經濟合作暨發展組織「美好生活指數」(Your Better Life Index)等。研究方法之設計乃先進行文獻回顧，續以內容分析法及對比分析法進行指標間的比較；另依德菲爾專家評估法進行指標之整合及因子篩選，再以層級分析法決定因子權重，並建構綜合性之複合指標。人類幸福感受指標之建構，反映出現今亟欲突破原侷限於「健康」、「教育」、「經濟」及「環境」等領域發展成就評量之趨勢，也昭示著人類自身的新需要。本研究希望透過前述研究流程，針對福祉與幸福指數之人文面向指標進行比較與整合，以提供未來此類指標修訂之參考。(簡報檔請附件)

除學生個人口頭發表文章外，亦擔任主場地 A(藤原洋紀念廳)「永續性指標與案例研究」首場次及第二場次主持人，與日本電信電話株式會社能源與環境系統實驗室(NTT)原美永子博士(Minako Hara)共同合作主持工作(參閱附件)。除學生的文章外，尚有來自德國(2 位)、荷蘭、法國、奈及

利亞、澳洲與義大利等國之學者專家進行發表(請參閱附件名單)。其中在學生前面兩位發表者係國際知名顧問或軟體資料庫研發公司之負責人或創辦人，如研發受全球學術界普遍採用之生命週期評估軟體 SimaPro 及資料庫的 PRe Consultants 公司創辦人 Mr. Mark Goedkoop 即為代表；而 Maki Consulting 公司負責人 Marc-Andree Wolf 亦是探討指標系統的翹楚。

本所李育明老師受邀主持 11 月 23 日上午在場地 D 的 G3「足跡方法論」場次，該時段適逢 Inaba 教授、成大陳家豪教授及本所碩士在職研究生鄭煥玲(題目：Carbon Footprint Offset Strategy for Township's Collection of Municipal Solid Waste - The Example of Pingxi District in New Taipei City/都市垃圾收運碳足跡抵換策略之研究-以新北市平溪區為例)發表相關文章，後因李老師因飛機班次時間，最後一位發表者時段遂商請陳家豪老師代為主持，討論過程踴躍且順利圓滿。(請參閱附件)

本所除前述主持及發表者外，尚有碩士在職研究生李玉鈴(題目：Strategic Environmental Assessment of Taiwan's Development Policy for Science Parks/台灣科學工業園區發展政策環境影響評估研究)與黃文歆(題目：Recycling of Lead-Acid Batteries in Taiwan and its Substance Flow Analysis/台灣地區廢鉛蓄電池回收體系與其元素流分析)分於 11 月 22 日上午「衝擊評估、風險評估及闡釋」場次(D2-2)及 11 月 23 日下午「廢棄物管理與資源回收」場次(C3-9)進行口頭發表；是以，本所研究生於本次進行口頭發表者計有 4 員(請參考所附議程)

本所在 11 月 22 日下午的海報發表場次(活動大廳)，亦同時有 4 為同學登場亮相。分別是博士研究生呂冠霖(題目：Assessment of Energy Efficiency for Industrial Symbiosis-The Case in Southern Taiwan)及楊文琪(題目：Revising Taiwan's Sustainability Development Indicator System with Incorporation of Vulnerability Assessment on Climate Change)，碩士在職研究生帥柏任(題目：Development Strategy of Coastal Wetlands in the Perspective of Biodiversity Conservation-The Example of Funyuang Wetland in Taiwan)及尤雅嬋(題目：Strategic Environmental Assessment of Taiwan's Sustainable Energy Development Policy)。在場除與國際知名學者交流心得外，全體參與大會人員數百人均蒞臨會場，與發表者熱烈討論及交換意見，本所四位發表者議題亦獲熱情回應。大會在 11 月 23 日傍晚於主場地 A(藤原洋紀念廳)舉行閉幕式，並相約兩年後再聚首，會後並有大會貼心舉辦之自費兩天一夜 city tour 行程，讓參與大會的學者專家得以一飽橫濱港灣美麗風光及享受在地美食。

三、 心得及建議

學生參與本次活動與兩年前(2010 年)參加在日本東京的"ISIE Asia-Pacific Meeting & ISIE MFA-ConAccount Meeting"相比有極大的不同體驗；一方面是此行除發表論文外，尚須擔任兩場次主持人，以往歷屆大會的各場次主持人均由相關領域的各國學者或教授擔任，大會此次邀請學生擔任此一任務、且係首日主場地的第一及第二場次主持人，獲此殊榮實感身份或有未符，只得盡力準備、全力以赴，過程圓滿順利。另一方面則因本次大會與前次東京相比，地點選在較屬郊區的橫濱舉辦，交通時間而言尚稱便利，卻可欣賞與東京不一樣的郊區風光，也對日本政府在落實公共工程品質及大學教育的努力，有更深一層的體驗。

此外，本所此行計有李育明教授、博士研究生(3 名)及碩士在職研究生(5 名)共 9 人一同與會，無論是入選口頭發表或海報發表之文章數，與國內其他大學(如：台灣大學、成功大學、聯合大學或景文科大等)或國際機關單位相比，皆屬本次大會之最，日本與國內學者於大會期間不止一次探究及詢問本所團隊此一情形，實屬難得與倍感光榮，也為我校在國際及亞太地區進行了一次極佳的宣傳。

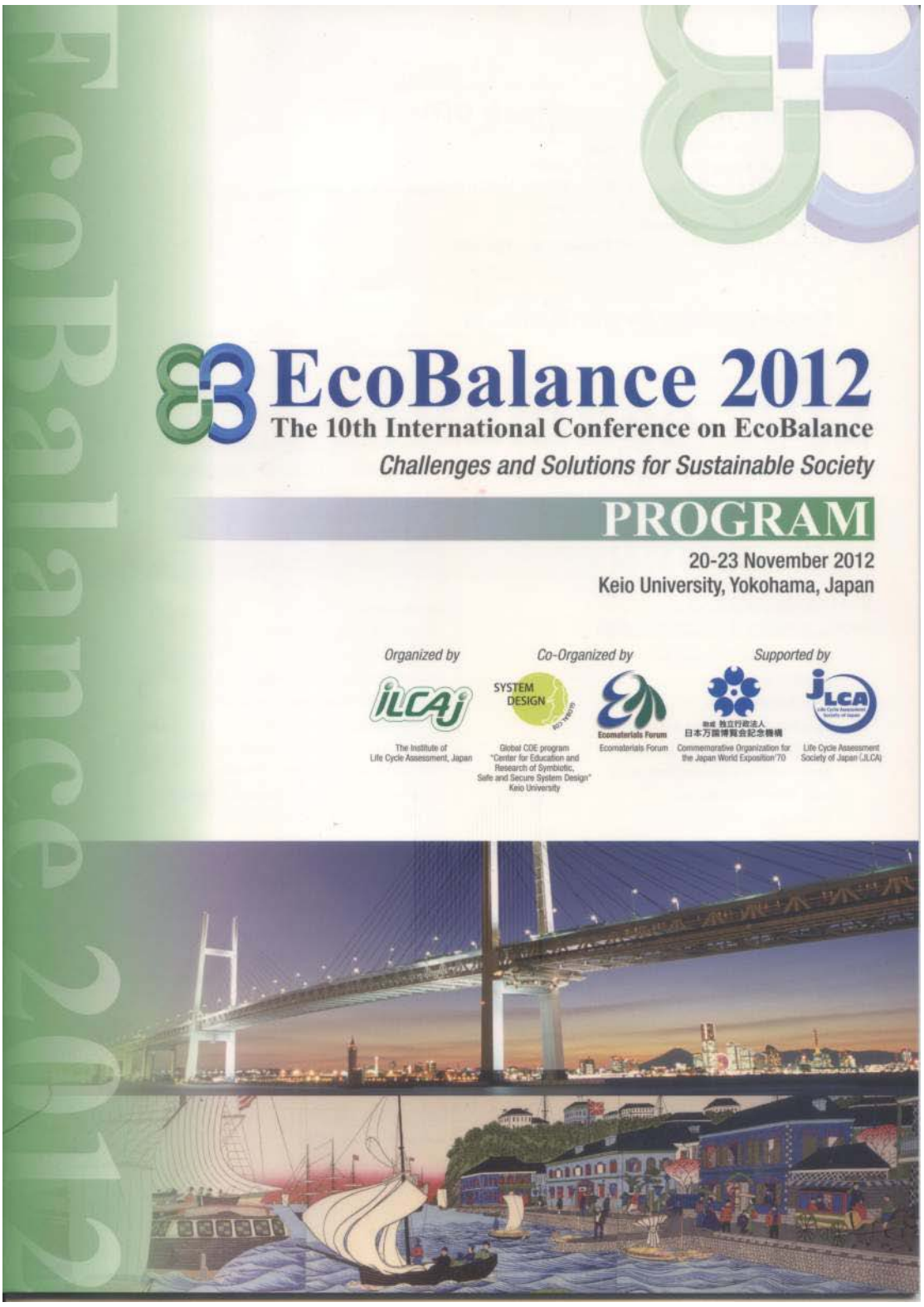
個人深覺大會主辦單位多項貼心規劃與服務，如現場日翻英口譯服務、全天候咖啡茶水供應站與報到註冊服務、場內外同步放映講演實況、同時備有葷素食及穆斯林專屬食材、優美的校園風光、便利的交通、寬敞明亮及嶄新的硬體設備等等不一而足，實可做為本所或我校未來籌辦大型國際學術會議之參考與榜樣。

四、 本次會議相關照片

	
大會歡迎晚宴	主持「永續性指標與案例研究」第一、二場次
	
論文口頭發表	參與大會海報發表場次
	
李教授介紹成大教授與國際權威學者交流	李育明老師研究群合影
	
與泰國瑪哈沙拉堪大學(MSU)講師交流	李育明教授主持足跡方法論場次

五、 研討會相關資料

(一) 大會手冊



(二) 大會時程及地點安排

EcoBalance 2012
The 10th International Conference on EcoBalance

Conference Site

Keio University
Hiyoshi Campus
Kyosei-kan, 2nd Floor

One-minute walk from Hiyoshi Station by
Tokyu Toyoko Line,
Tokyu Meguro Line or
Yokohama Municipal Subway Green Line

Summary of Events

Event	Date		Time	Place & Other Information
Registration Desk Open Hours	Nov. 20	Tue	16:30 – 19:00	Raiosha 1F, Faculty Lounge
	Nov. 21	Wed	09:00 – 17:00	Fujiwara Hiroshi Hall foyer
	Nov. 22	Thu	08:00 – 17:00	Fujiwara Hiroshi Hall foyer
	Nov. 23	Fri	08:00 – 15:00	Fujiwara Hiroshi Hall foyer
Welcome Party	Nov. 20	Tue	18:00 – 20:00	Raiosha 1F, Faculty Lounge
Opening Ceremony	Nov. 21	Wed	10:00 – 10:30	Room A -Fujiwara Hiroshi Hall -
Plenary Session	Nov. 21	Wed	10:30 – 12:00	Room A -Fujiwara Hiroshi Hall -
Lunch	Nov. 21	Tue	12:00 – 13:30	Event Hall
	～ 23	Thu		(Lunch boxes are served)
Banquet	Nov. 22	Thu	19:40 – 21:30	Restaurant Ship 'Royal Wing' on board from Osanbashi International Port Terminal *Shuttle bus service from Kyosei-kan
Closing Ceremony	Nov. 23	Fri	14:50 – 16:10	Room A -Fujiwara Hiroshi Hall -
Farewell Party	Nov. 23	Fri	16:10 – 17:10	Event Hall
TOHOKU Excursion (Stay in Sendai)	Nov. 23 ～ Nov. 24	Fri Sat	17:45 leaves Kyosei-kan 17:56 back to Tokyo	Fare: ¥53,000 Apply to home page website: https://amarys-jtb.jp/ecobalance2012 Application deadline: Nov. 13 (Tue)

(三) 大會議程(11/21-11/23 三天議程，11/20 之歡迎晚會除外)

Nov.21	Room A (Fujiwara Hiroshi Hall)		Room B (Multipurpose Room 1)		Room C (Multipurpose Room 2)		Room D (Multipurpose Room 3)	
10:00-10:30	**Opening & Plenary** (Room A -Fujiwara Hiroshi Hall-)							
10:30-11:15	**Keynote 1** "FutureCity" Initiative Hiroto IZUMI (Cabinet Secretariat)							
11:15-12:00	**Keynote 2** The future created by EV comes in view -EV marketplace acceptance and its future prospects as social system- Masanori UEDA (NISSAN MOTOR CO., LTD.)							
12:00-13:30	**Lunch**							
	[S1-1] **Sustainability Index and Case Study**		**[S7-1]** **Sustainable Nutrient Management**		**[S4-1]** **Water Footprint**		**[S6-1]** **Design and management for the environment**	
13:30-13:50	A1-01	Selecting the Environmental Indicator for Decoupling Indicators Marc-Andree WOLF (Germany) Maki Consulting	B1-01 Invited	Spatially Explicit Assessment of Nutrient Demands for Promoting Efficient Regional Fertilizer-Use Management in Vietnam Tien Minh TRAN (Vietnam) Soils and Fertilizers Research Institut	C1-01	ISO Water Footprint: Principles and Guidelines Sebastien HUMBERT (Switzerland) Quantis	D1-01	Symbiosis of Science and Application - LCA as Business Case Martin BAITZ (Germany) PE INTERNATIONAL AG
13:50-14:10	A1-02	Development and Implementation of Social Metrics in a Large Company Mark GOEDKOOP (the Netherlands) PRe Consultants	B1-02	Nutrient Flow on Food and Feed Production Shinichiro MISHIMA (Japan) National Institute for AgroEnvironmental Sciences	C1-02 Invited	Review of Methods Addressing Freshwater Use in Life Cycle Inventory and Impact Assessment Anna KOUNINA (Switzerland) Quantis /École Polytechnique Fédérale de Lausanne	D1-02	A CAD System for Product Life Cycle Design Yuki MATSUYAMA (Japan) Osaka University
14:10-14:30	A1-03	Comparison and Integration of Human Dimension's Indicators for Welfare and Happiness Pin-Chih WANG (Taiwan/R.O.C) National Taipei University	B1-03 Invited	Phosphorous Recovery Technologies for Municipal and Industrial Wastewater: Taiwan's Perspective Gwo-Dong ROAM (China) Environmental Protection Administration	C1-03	Nexus between Water Withdrawal and Land Use in Water Footprint Masaharu MOTOSHITA (Japan) National Institute of Advanced Industrial Science and Technology	D1-03	Sustainability Communication in the Life Cycle: Gates and Gaps Benjamin Craig MCLELLAN (Japan) Kyoto University
14:30-14:50	A1-04	Social Impact Index for ICT Services - Case Study in Emerging Countries- Julien BOISSEAU (Japan) France Telecom - Orange	B1-04	Novel Technology for Phosphorus Recycling Using Amorphous Calcium Silicate Hydrates Kenji OKANO (Japan) Osaka University	C1-04	Regionalized Cumulative Water Intensity: A Practical Approach to Corporate Water Accounting Bettina JOA (Germany) Pforzheim University	D1-04	Comparison of the CO2 Emission of Electric Vehicle and Fuel Cell Vehicle Using the Biomass Gasification System Considering the Change of the Traffic Flow Aya ISHIGAKI (Japan) Tokyo University of Science
14:50-15:10	**Break**							
	[S1-2] **Sustainability Index and Case Study**		**[S7-2]** **Sustainable Nutrient Management**		**[S4-2]** **Water Footprint**		**[G8-1]** **New challenges in management of supply chain**	
15:10-15:30	A1-05	Life Cycle Management of Timber Sawmill Wastes in Minna, Nigeria Ibrahim Olayinka JIMOH (Nigeria) Federal University of Technology	B1-05 Invited	Chemical and Biochemical Transformation of Phosphate Compounds to Produce and Rycycle Biological Energy Akio KURODA (Japan) Hiroshima University	C1-05 Invited	Comprehensive Database for Use in LCA-Based Water Footprinting : Results and Case Studies Sebastien HUMBERT (Switzerland) Quantis	D1-05	Carbon Footprint and Life Cycle Assessment of Organisations Matthias FINKBEINER (Germany) Technical University Berlin
15:30-15:50	A1-06	Mineral and Energy Futures: Implications for Technology and Policy in Producing and Consuming Countries Damien GIURCO (Australia) University of Technology	B1-06	Phosphorus Flow Analysis Based on Integrated Phosphorus Cycle Input Output Model Kazuyo MATSUBAE (Japan) Tohoku University	C1-06	Expansion of Comprehensive Inventory Database (IDEA) to Water Footprint Kiyotaka TAHARA (Japan) National Institute of Advanced Industrial Science and Technology	D1-06	Sustainable Pathways to Biofuel Development in the U.S. Sangwon SUH (U.S.A.) University of California
15:50-16:10	A1-07	Subcategory Assessment Method for Social LCA: Application for Workers in Cocoa Soap Natura Paola Karina SANCHEZ RAMIREZ (Italy) G. D'Annunzio University	B1-07	Encouraging Innovation for Sustainable Phosphorus Management: Technology, Management, and Public Policy Masaru YARIME (Japan) The University of Tokyo	C1-07	Methodological Lessons Learned from Industrial Water Footprint Case Studies Markus BERGER (Germany) Technische Universitaet Berlin	D1-07	Sustainability Return on Investment: A Scenario-Based Multicriteria Assessment Tool for Policy-Making Lise LAURIN (U.S.A) EarthShift, LLC
16:10-16:30	A1-08	Systematic Approach for the Comparison of Sustainability Assessment Methods in the Aviation Sector Robert ILG (Germany) University of Stuttgart		Discussion	C1-08	Water Uses in the Life Cycle of Automobiles Hyung Chul KIM (U.S.A) Ford Motor Company	D1-08	Design of Robust and Flexible Plastic Recycling System against Variation Risk Haruna ISHIKAWA (Japan) The University of Tokyo
16:30-16:50	**Break**							
	[G5-2] **Design and management for the environment**		**[G6]** **International cooperation and LCA database**		**[S4-3]** **Water Footprint**		**[G8-2]** **New challenges in management of supply chain**	
16:50-17:10	A1-09	The Impacts of Technology Innovation on WEEE Management: A Case study of Display Products Bin LU (China) Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences	B1-09	The UNEP/SETAC Life Cycle Initiative: Life Cycle Thinking evolution 2002-2012 and Phase 3 Sonia VALDIVIA (France) United Nations Environment Programme	C1-09	Spatialized Life Cycle Water Footprinting of U.S. Milk Linsey LESSARD (U.S.A) Quantis International	D1-09	Rare Materials Used by Green Energy Industries - A Case Study of Taiwan Lu-Yen CHEN (China) National United University
17:10-17:30	A1-10	Tracking the Impact of Environmental Regulations on Development and Diffusion of Innovations: Evidence from Waste Management Technologies in Japan Helmut YABAR (Japan) University of Tsukuba	B1-10	Lessons Learned from Decades of LCAs: Value of a Life Cycle Approach in Evaluating the Environmental Impacts of Packaging for Food/Beverage Applications - A UNEP/SETAC Project Bruce VIGON (U.S.A.) Society for Environmental Toxicology and	C1-10	Water Footprint Assessment on Major Agricultural and Livestock Products Minjung SON (Korea) SMaRT ECO Co., Ltd.	D1-10	Study on Secondary Damages Caused by the Great East Japan Earthquake by Analyzing Industrial Supply Chains in Japan Yutaka GENCHI (Japan) National Institute of Advanced Industrial Science and Technology
17:30-17:50	A1-11	Practical Framework for Chemical Risk Management in Product Manufacturing: Application to Process Design in Industrial Cleaning Emi KIKUCHI (Japan) The University of Tokyo	B1-11	Using Life Cycle Assessment for Implementing Multilateral Environmental Agreements Guido W. SONNEMANN (France) University of Bordeaux	C1-11	Water Footprint of Bioethanol Production Supply Chain in Thailand Shinatiphkorn PONGPINYOPAP (Thailand) Kasetsart University		Panel Discussion
17:50-18:10	A1-12	Rainwater Harvesting for Environmental Load Reduction Toshihiro KASAI (Japan) Fukui University of Technology	B1-12	Consistent Calculation of Multiple System Models and Improved Integration of Regionalized Data in a Background Inventory Database Gregor WERNET (Switzerland) Ecoinvent Centre	C1-12	Poster Spotlight C1-12-1 Yuya ONO C1-12-2 Sang-Hyun LEE C1-12-3 Shinya MATSUMOT		Panel Discussion

Nov.22	Room A (Fujiwara Hiroshi Hall)		Room B (Multipurpose Room 1)		Room C (Multipurpose Room 2)		Room D (Multipurpose Room 3)	
	[S1-3] Sustainability Index and Case Study		[S3-1] Renewable Energy for Sustainable Development		[S2-1] Recent Progress in Material Flow Analysis and Sustainable Resource Management		[G2-1] Impact assessment, risk assessment and interpretation	
9:00-9:20	A2-01 Invited	Evaluation of residential environment and its indicators Yasushi ASAMI (Japan) The University of Tokyo	B2-01	A Comparison of Life Cycle Inventory of Pre-Harvest, Production of Crude Oil, and Biodiesel Production on Jatropha Curcas and Palm Oil as a Feedstock for Biodiesel in Indonesia Kiman SIREGAR (Indonesia) Bogor Agricultural University	C2-01	Forging a Low-Carbon Steel Cycle in Asia Tao WANG (Japan) Ritsumeikan University	D2-01	Global High Resolution Freshwater Eutrophication Impact Characterization: Application to Milk Andrew HENDERSON (U.S.A) University of Michigan
9:20-9:40	A2-02	Sustainability Assessment of Local Governments with the "CASBEE-City" Tool Using Public Statistical Information Shun KAWAKUBO (Japan) Keio University	B2-02	Evaluation on the PhilRice's Up-Draft Rice Husk Gasification for Power Generation Elmer Granadozo BAUTISTA (Philippines) Philippine Rice Research Institute	C2-02	Material Flow Analysis on Ship Breaking and Recycling Industry in Bangladesh Mohammad SUJAUDDIN (Japan) The University of Tokyo	D2-02	Strategic Environmental Assessment of Taiwan's Development Policy for Science Parks Yu-Ling LEE (Taiwan(R.O.C)) National Taipei University
9:40-10:00	A2-03	A Study in Reconstruction Design of City Blocks by Low Carbon Performance Evaluation System Ryota GOTO (Japan) Nagoya University	B2-03	Optimisation Analysis for BTL-Fuel Production Systems via Gasification of Biomass Kenji KOIDO (Japan) Tokyo University of Science	C2-03	Application of High Resolution SAR Data for Modelling Building Stock: Case Study of Sapporo, Japan Hanwei LIANG (Japan) Nagoya University	D2-03	Thai Day Spa Service Greenhouse Gas Emission Reduction Jittima PRASARA-A (Thailand) Mahasarakham University
10:00-10:20	A2-04	A Subjective-Objective Hybrid Model for the Assessment of Urban Quality of Life: Case Study of Shanghai, China JI HAN (Japan) Nagoya University	B2-04 Invited	Waste to Energy: Kinetic Improvement and Clean-Up of Gases for High Efficient Gasifier and Fuel Cell Integration Radenka MARIC (U.S.A) University of Connecticut	C2-04	Estimation of Steel Use in Buildings by Night Time Light Image and GIS Yasunari MATSUNO (Japan) The University of Tokyo	D2-04	Estimating Marginal Willingness to Pay (MWTP) for Environmental Improvement by Co-Benefit of Global Warming Mitigation in Asian Countries Using Conjoint Analysis and Benefit Transfer Masahiro NISHIO (Japan) National Institute of Advanced Industrial Science and Technology
10:20-10:40	Break							
	[S1-4] Sustainability Index and Case Study		[S3-2] Renewable Energy for Sustainable Development		[S2-2] Recent Progress in Material Flow Analysis and Sustainable Resource Management		[G2-2] Impact assessment, risk assessment and interpretation	
10:40-11:00	A2-05	Sustainability Indicator System with Visualized Causal-links Information - Application of Ontology and a Case Study Keishiro HARA (Japan) Osaka University	B2-05	The Blue Revolution: Oceans as Ultimate Sustainable Resource Patrick K. TAKAHASHI (U.S.A) Blue Revolution Hawaii, Inc.	C2-05 Invited	The Long-Term Availability of Copper: A Scenario Analysis Laura SCHNEIDER (Germany) Technische Universitaet Berlin	D2-05	Direct Consumer Exposure during Use of Personal Care Products, Plasticizers and Flooring Materials Alexi ERNSTOFF (U.S.A) University of Michigan
11:00-11:20	A2-06	Spatiotemporal Analysis of Sustainability Components - Application of an Indicator System for Chinese Provinces Michinori UWASU (Japan) Osaka University	B2-06	Assessing Long-Term Sustainability of District Heating Systems Erik O AHLGREN (Sweden) Chalmers University of Technology	C2-06	Development of an Integrated Model to Estimate Long-Term Copper Demand Based on Sustainability Scenarios Yusuke KISHITA (Japan) Osaka University	D2-06	Evaluation of Regulatory Impact on Brominated Flame Retardants with Life-Cycle Risk Assessment Satoshi MANAGAKI (Japan) Yokohama National University
11:20-11:40	A2-07	Developing Sustainability Reporting in Real Estate Companies - Experiences from Finland Riikka Kaarina KYRO (Finland) Aalto University	B2-07	Exploiting Urban Energy Resource: Exploring Potentials and Challenges with Small Scale Tofu Production in Residential Area Yee Shee TAN (Taiwan) National Cheng Kung University	C2-07	Ore Grade Decrease as Indicator for Metal Scarcity in Life Cycle Assessment Marisa Diana Moura VIEIRA (the Netherlands) PRe Consultants	D2-07	Damage Assessment of Global Warming in LIME3 Ryota II (Japan) Pacific Consultants Co., Ltd.
11:40-12:00	A2-08	Environmental Impacts of Norwegian Dwelling Sector: Life Cycle Assessment Rolf Andrew BOHNE (Norway) Norwegian University of Science and Technology	B2-08	PEMFC-Supercapacitor Hybrid Power Source System for Smartphone Using Multi-Port Bidirectional DC-DC Converter Noboru KATAYAMA (Japan) Tokyo University of Science	C2-08	Combined Application of MFA with Thermodynamic Analysis for Sustainable Resource Use Kenichi NAKAJIMA (Japan) National Institute for Environmental Studies	D2-08	An Assessment of Human Health Impact Caused by the Accident of Fukushima Daiichi Nuclear Power Plant Using a Methodology of Life Cycle Impact Assessment Norihiro ITSUBO (Japan) Tokyo city university
12:00-13:30	Lunch							
	[G1] Input-output analysis		[S3-3] Renewable Energy for Sustainable Development		[S2-3] Recent Progress in Material Flow Analysis and Sustainable Resource Management		[G2-3] Impact assessment, risk assessment and interpretation	
13:30-13:50	A2-09	Estimation of GHG Emission Intensities for Food and Feed Sectors Using the 2005 Japanese Input-Output Table: Reflecting the Actual Conditions of Overseas Activities Eiji TAKAHASHI (Japan) Yokohama National University	B2-09	Realising the Potential in Providing Sustainable Renewable Energy from Malaysian Palm Oil Wastes Poo Yuen NG (Malaysia) Malaysian Palm Oil Council	C2-09	Estimation of Local Stocks and Discards of Small-Size Electric and Electronic Equipment and their Content Metals to Establish Efficient Collection Systems in Japan Seiji HASHIMOTO (Japan) Ritsumeikan University	D2-09	A New Quantitative Method of Evaluating the Impacts of Mining on Biodiversity Hiroko WATANDO (Japan) Toshiba Corporation
13:50-14:10	A2-10	Bilateral Flow of Solid Waste between 47 Prefectures in Japan: A Multi-Region Waste Input-Output Approach Makiko TSUKUI (Japan) Tokyo International University	B2-10	Development of Well-to-Wheel Model to Evaluate Energy Consumption and Environmental Impact for Alternative Vehicle Fuels in Thailand Worayut - SAIBUATRONG (Thailand) Kasetsart University	C2-10	Generation of Waste Mobile Phone in China: Modeling and Uncertainty Jiankin YANG (China) Chinese Academy of Sciences	D2-10	Investigation on the Functional Units of Energy and Steel Products in a LCA Tool for Buildings Yow-jia HSUEH (Japan) Keio University
14:10-14:30	A2-11	A Time Series of Global Carbon Footprints at High Country and Sector Detail Keiichiro KANEMOTO (Australia) The University of Sydney	B2-11	High Efficient Multi Fuel Solar Hybrid Power Plants to Ease the Access to Sustainable Energy in Remote Regions, the Case of Brazil Witold Roger POGANIETZ (Germany) Karlsruhe Institute of Technology	C2-11	International Material Flow Analysis on Green Technologies with a Global Link Input-Output Model Keisuke NANSAI (Japan) National Institute for Environmental Studies	D2-11	Variability-Based Optimal Design of Plastic Recycling Jun NAKATANI (Japan) The University of Tokyo
14:30-14:50	A2-12	Structural Understanding of Production Network by Visualizing Inter-Sector Carbon Flow: A Path-Based Matrix Decomposition Analysis Yasushi KONDO (Japan) Waseda University	B2-12	Global Warming and Bioenergy - Accounting for Geochemical and Geophysical Perturbations Anders Hammer STROMMAN (Norway) Norwegian University of Science and Technology	C2-12	Trade-Off Analysis between CO2 Emission and Other Environmental Burdens under Future Penetration Scenarios of Next Generation Vehicles Yusuke NAGATA (Japan) Osaka University	D2-12	Category Importance Aspects of Life Cycle Assessment: Survey Based Category Importance Andante Hadi PANDYASWARGO (Japan) Waseda University
15:10-16:10	Poster Session 1 (Event Hall)							
16:10-16:30	Break							
16:30-17:30	Poster Session 2 (Event Hall)							
19:40-21:30	Banquet at 'Royal Wing'							

Nov.23	Room A (Fujiwara Hiroshi Hall)		Room B (Multipurpose Room 1)		Room C (Multipurpose Room 2)		Room D (Multipurpose Room 3)	
	[S5-1] Sustainable agriculture and food toward globalizing Asia		[S6-1] Environmental Management Accounting		[S8-1] Materials technology for resource sustainability		[G4] Sustainable Management	
9:00-9:20	A3-01 Invited	Life Cycle Assessment and Footprint in Agri-Food: Practical Experiences from Thailand Rattanawan MUNGKUNG (Thailand) Director of VGREEN	B3-01 Invited	Controlling Resource Flows for a Sustainable Society Bernd WAGNER (Germany) University of Augsburg	C3-01 Ivited	9:00-9:30 What is the Ecomaterial in this 21st century? Kohmei HALADA (Japan) National Institute for Materials Science	D3-01	Quantitative Estimation for Value of Environmental Actions in Contrast to Technological Innovations Naoko MAE (Japan) Kyoto University
9:20-9:40	A3-02	Development of the Greenhouse Gas Emissions (GHG) Accounting Tool for the Korean Dairy Cow Farm Chun-Youl BAEK (Korea) Ajou university	B3-02	Looking at Waste Differently: A Success Story of Material Flow Cost Accounting (MFCA) Implementation in Malaysia A Halim B SULAIMAN (Malaysia) University of Malaya			D3-02	A Novel Graphical Representation Method for Scenario Analysis: Application to the Design of Energy System I-Ching CHEN (Japan) The University of Tokyo
9:40-10:00	A3-03	Greenhouse Gas Emissions in Sustainable Coffee Production Ampira CHAROENSAENG (Thailand) Chulalongkorn University	B3-03	Material Flow Cost Accounting in Supply Chain for Green Manufacturing Michiyasu NAKAJIMA (Japan) Kansai University	C3-02 Ivited	9:30-10:00 Recent progress in sustainable management of material resources Yuichi MORIGUCHI (Japan) The University of Tokyo	D3-03	Proposal of Dynamic LCI for Paprika Supply Chain due to an Environmentally Friendly Technology in Indonesia Eldetweijs Adriinjani PUTRI (Indonesia) Institut Teknologi Bandung
10:00-10:20	A3-04	An Integrated Model of Sugarcane-Derived Ethanol Production by Interdisciplinary Analysis across Agriculture and Engineering Yasunori KIKUCHI (Japan) The University of Tokyo	B3-04	A Model for the Integrated Application of EMA, MFCA and CP Seakle GODSCHALK (South Africa) Environmental & Sustainability Solutions	C3-03	For Whom and for What Ecomaterials are? Yoshikazu SHINOHARA (Japan) National Institute for Materials Science	D3-04	A Consideration of Bio-Fuels Supply from LCI and Cost Aspects Kiyoshi DOWAKI (Japan) Tokyo University of Science
10:20-10:40	Break							
	[S5-2] Sustainable agriculture and food toward globalizing Asia		[S6-2] Environmental Management Accounting		[S8-2] Materials technology for resource sustainability		[G3] Footprint methodology	
10:40-11:00	A3-05	Proposal of a Unified Biodiversity Impact Assessment Method Jan Paul LINDNER (Germany) Fraunhofer IBP	B3-05	Development of an Integrated MFCA and CFP Model: Introducing Cost Information into CFP Calculation Katsuhiko KOKUBU (Japan) Kobe University	C3-05	Thermal Radiation Control Coatings at High Temperature for Efficient Energy Use Hideki KAKISAWA (Japan) The University of Tokyo	D3-05	The Effectiveness of System Certification Scheme in CFP Communication Program Shoichiro TSURUTA (Japan) Japan Environmental Management Association for Industry
11:00-11:20	A3-06	Characterizing Pesticide Residues and Related Health Impacts in Life Cycle Impact Assessment Peter FANTKE (Germany) University of Stuttgart	B3-06	Applying Material Flow Cost Accounting (MFCA) in Life Cycle Assessment Hongtao WANG (China) Sichuan University	C3-06 Invited	Highly functional bioplastic used for electronic products: polylactic acid composites and cellulose-cardanol resin Masatoshi UI (Japan) NEC Corporation	D3-06	Criteria of Carbon Footprint Inventory Data Selection from Software and Databases Jahau Lewis CHEN (Taiwan/R.O.C) National Cheng Kung University
11:20-11:40	A3-07	World Food LCA Database Jens LANSCHE (Switzerland) Agroscope Reckenholz-Taenikon Research Station	B3-07	Life Cycle Costing (LCC) of Farm Milk Production: Cost Assessment of Environmental Impact Mitigation Strategies Olivier JOLLIET (U.S.A) University of Michigan	C3-07	The Impact of Land-Use Change for Bio-Based Plastics in Thailand Unchalee SUWANMANEE (Thailand) Srinakharinwirot University	D3-07	Carbon Footprint Offset Strategy for Township's Collection of Municipal Solid Waste - The Example of Pingxi District in New Taipei City Huan-Ling CHENG (Taiwan/R.O.C) National Taipei University
11:40-12:00	A3-08	A Comparative Analysis of Different Assessment Methods for the Environmental Impacts of Agricultural Inputs Kiyotada HAYASHI (Japan) National Agriculture and Food Research Organization	B3-08	Resource Efficiency in Manufacturing Companies - Cost and Greenhouse Gas Emission Savings Mario SCHMIDT (Germany) Pforzheim University	C3-08	Integrated Indicator for Resource Dependency in terms of TMR Eiji YAMASUE (Japan) Kyoto University	D3-08	The Estimation of the CO2 Emission of the Menu in the Restaurant Atsushi INABA (Japan) Kogakuin University
12:00-13:30	Lunch							
	[S5-3] Sustainable agriculture and food toward globalizing Asia		[S6-3] Environmental Management Accounting		[G9] Waste management and recycling		[G7] Sociology, psychology and education	
13:30-13:50	A3-09	Assessment of Rice Cultivation with Ecological Scarcity Japan Rolf FRISCHKNECHT (Switzerland) ESU-services Ltd.	B3-09	Development of Input-Output Inventory Data Base for GHG in China Hiroshi YAMAGUCHI (Japan) Tokyo City University	C3-09	Recycling of Lead-Acid Batteries in Taiwan and its Substance Flow Analysis Wen-Hsin HUANG (Taiwan/R.O.C) National Taipei University	D3-09	Estimation of Outcomes of Consumer's Rebound Effect Kotaro KAWAJIRI (U.S.A) National Institute of Advanced Industrial Science and Technology
13:50-14:10	A3-10	Evaluation of Mitigation Technologies and Footprint of Carbon in Unhulled Rice Production of Korea Deog Bae LEE (Korea) National Academy of Agricultural Science, Rural Development Administration	B3-10	Generic Business Strategies for a Sustainable Business Model - Based on the Korean Cases Yoon-Young CHUN (Korea) Ajou university	C3-10	E-waste Recycling and Environmental Impact in Asia Atsushi TERAZONO (Japan) National Institute for Environmental Studies	D3-10	Advances in Knowledge Organization Related to Sustainability Science: Prospects for Higher Education Harald Ernst OTTO (Italy) Polytechnic University of Marche
14:10-14:30	A3-11	Life-Cycle Assessment of Ecologically Cultivated Rice Applying DNDC-Rice Model Naoki YOSHIKAWA (Japan) Ritsumeikan University	B3-11	Systematich Monetization of Environmental Impacts Hannes KRIEG (Germany) University of Stuttgart	C3-11	Closing the Loop for Industrial Wastes: a Multi-Objective Mixed-Integer Linear Program for Sustainable Industrial Waste and Resource Management Cari O. VADENBO (Switzerland) ETH Zurich	D3-11	Bridging the Gap of International Intercity Environmental Cooperation: A Kitakyushu - Da Nang Survey Takaaki KATO (Japan) The University of Kitakyushu
14:30-14:50	A3-12	Visualizing the Influence of Weed Control Methods on Environmental Impacts of Organic Rice Cultivation in Japan Shingo HOKAZONO (Japan) National Agriculture and Food Research Organization	B3-12	Exploring the Use of MFA from a Company Perspective Steve HARRIS (Sweden) SKF-Chalmers University Technology Centre for Sustainability	C3-12	Scenario Planning of Waste Biomass Management in the Near Future Rokuta INABA (Japan) National Institute for Environmental Studies	D3-12	Environmental and Socio-Economic Aspects of Solid Waste Recovery and Recycling in Bangladesh: A Case Study of Dhaka City Moushumi ZAHUR (Japan) University of Kitakyushu
14:50-16:10	**Closing** (Event Hall) **Farewell Party** (Event Hall)							

(四) 擔任主持人場次及論文發表場次

Opening & Plenary Session

Opening Ceremony (Room A) November 21, 2012 10:00-10:30
Plenary Session (Room A) November 21, 2012 10:30-12:00

Chair : Toshiharu IKAGA

Keynote 1 10:30-11:15

"FutureCity" Initiative

Hiroto IZUMI
Special Advisor to the Cabinet, Government of Japan

Keynote 2 11:15-12:00

The Future Created by EV Comes in View
-EV Marketplace Acceptance and its Future Prospects as Social System-

Youichi KISHIMOTO
NISSAN MOTOR CO., LTD

Oral Session

Special Sessions 1 (Room A) November 21, 2012 13:30-14:50

Sustainability Index and Case Study

Chair : M. HARA / P.C. WANG

A1-01 13:30-13:50

Selecting the Environmental Indicator for Decoupling Indicators

Marie-Andree WOLF[1], Kirana CHOMKHAMSRI[2]
[1]Maki consulting, [2]TU Berlin

A1-02 13:50-14:10

Development and Implementation of Social Metrics in a Large Company

Mark GOEDKOOP, Joao FONTES
PRe Consultants

A1-03 14:10-14:30

Comparison and Integration of Human Dimension's Indicators for Welfare and Happiness

Pin-Chih WANG[1], Yuh-Ming LEE[1], Chin-Yang CHEN[2]
[1]National Taipei University, [2]Ming Chi University of Technology

A1-04 14:30-14:50

Social Impact Assessment Tool for the Design of Sustainable ICT Services
— Case Study on M-Health Service in Senegal —

Julien BOISSEAU[1], Tomoko TANAKA[2], Ahmed ZEDDAM[1], Jean-Marc RAIBAUD[1], Kazue Ichino TAKAHASHI[2], Yoh SOMEMURA[2], Justine VICHARD[1], Ralph ANKRI[1]
[1]France Telecom - Orange, [2]NTT Corporation

Coffee Break 14:50-15:10

Special Sessions 1 (Room A) November 21, 2012 15:10-16:30

Sustainability Index and Case Study

Chair : M. HARA / P.C. WANG

A1-05 15:10-15:30

Life Cycle Management of Timber Sawmill Wastes in Minna, Nigeria

Ibrahim Olayinka IMOH[1], He Kehinde ADEWUMI[2]
[1]Federal University of Technology, Minna, [2]Obafemi Awolowo University, Ile-Ife

A1-06 15:30-15:50

Mineral and Energy Futures: Implications for Technology and Policy in Producing and Consuming Countries

Damien GIURCO[1], Daniel FRANKS[2], Benjamin McLELLAN[3], Timothy PRIOR[4]
[1]University of Technology, Sydney, [2]University of Queensland, [3]Kyoto University, [4]ETH Zurich

A1-07 15:50-16:10

Subcategory Assessment Method for Social LCA: Application for Workers in Natura's Cocoa Soap

Paola Karina SANCHEZ RAMIREZ[1], Luigia PETTI[1], Fabien BRONES[1], Cassia Maria LIE UGAYA[2]
[1]G. D'Annunzio University, [2]Federal Technological University of Parana, [3]Natura Inovação e Tecnologia de Produtos Ltda

A1-08 16:10-16:30

Systematic Approach for the Comparison of Sustainability Assessment Methods in the Aviation Sector

Robert ILG[1], Katharina BAUCH[1], Hannes KRIEG[1], Jan-Paul LINDNER[2], Inge WETZEL[3]
[1]University of Stuttgart, [2]Fraunhofer Institute for Building Physics, [3]EADS Innovation Works

Coffee Break 16:30-16:50

(五) 本所李育明老師擔任日本生命週期評估學會之國際諮詢理事會理事

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√ **Yuh-Ming LEE**	National Taipei University, Taiwan

(六) 本所李育明老師擔任足跡方法論場次主持人

Oral Session

General session 3 (Room D) November 23, 2012 10:40-12:00

Footprint Methodology

Chair : Y.M. LEE

D3-05 10:40-11:00

The Effectiveness of CFP System Certification Scheme in the CFP Communication Program

Shoichiro TSURUTA, Kengo MINAMIYAMA, Masayuki KANZAKI

Japan Environmental Management Association for Industry

D3-06 11:00-11:20

Criteria of Carbon Footprint Inventory Data Selection from Software and Databases

Jahau Lewis CHEN, Yi-Hsing WEN

National Cheng Kung University

√ **D3-07** 11:20-11:40

Carbon Footprint Offset Strategy for Township's Collection of Municipal Solid Waste - The Example of Pingxi District in New Taipei City

Huan-Ling CHENG, Yuh-Ming LEE

National Taipei University

D3-08 11:40-12:00

The Estimation of the CO_2 Emission of the Menus in the Restaurant

Rio KAZAMA, Ryoko MORIMOTO, Atsushi INABA

Kogakuin University

Lunch (90min) 12:00-13:30

General session 7 (Room D) November 23, 2012 13:30-14:50

Sociology, Psychology and Education

Chair : Y. HONDO

D3-09 13:30-13:50

Estimation of Outcomes of Consumer's Rebound Effect

Kotaro KAWAJIRI[1], Tomohiro TABATA[2], Tomoluko IHARA[3]

[1]IIT AIST, [2]Kobe University, [3]The University of Tokyo

D3-10 13:50-14:10

Advances in Knowledge Organization Related to Sustainability Science: Prospects for Higher Education

Harald Ernst OTTO

Polytechnic University of Marche

D3-11 14:10-14:30

Bridging the Gap of International Intercity Environmental Cooperation: A Kitakyushu - Da Nang Survey

Takaaki KATO[1], Eri HIMESHIMA[1], Hai HOANG[2], Quang Van TRAN[2], Hidenori NAKAMURA[3]

[1]The University of Kitakyushu, [2]Da Nang University of Technology, [3]Institute for Global Environmental Studies

D3-12 14:30-14:50

Analysis of Decision-Makers' Behavior and its Effects on Material Flows with Multi-Agent Simulation: A Case Study in E-Waste Recycling Systems

Kiyofumi SUGAWARA, Shinsuke MURAKAMI, Jiro YAMATOMI

The University of Tokyo

Closing Ceremony (Room A) 14:50-16:10

Farewell Party (Event Hall) 16:10-17:10

(七) 擔任 S1-1 及 S1-2 場次主持人歡迎詞及各發表人介紹詞

S1-1

Good afternoon, ladies and gentlemen, I'm Pin-Chih Wang, I'm a phd student from National Taipei University (Taipei, Taiwan). It's my honor to chair the following two sessions.

Taking this occasion, I would like to welcome each professor, expert and everyone to this session of EcoBalance 2012 in Yokohama between 21-23. Nov. 2012. I would like to thank the friendly, successful and hardworking team of Conference Organizing team, their hard work is very greatly appreciated. I'm really grateful to all speakers, session participants and discussants who will contribute to the success of our meeting, and of course most importantly enjoying Conference programs and events which is truly dedicated to you all.

The aim of the first two sessions are to share and learn from the experts in "Sustainability Index and Case Study", we have four presenters including myself. Allotted time for oral presentation is 20 min including Q&A basically. (Presenters are requested to bring and use your own PC for presentations and our PC Projector is available, please to be sure you have your appropriate adapter for connecting to a VGA cable for the projector.) We'll ring the first bell at exact 12 min and the second bell at last 5 min.

1.

Let's start with Mr. Marc-Andree WOLF, he is the owner of Maki Consulting in Germany, Mr. Wolf is a well-known Geoecologist (MSc) with many years working experience in Life Cycle Assessment and Life Cycle Sustainability Assessment with focus on database development, software solutions, methodology development. His topic is "Selecting the Environmental Indicator for Decoupling Indicators", let's welcome Mr. Wolf.

2.

Our second presenter is Mark GOEDKOOP of PRe Consultants (the Netherlands), as we know that Mark established PRe in 1990 and pioneered the field of LCA. He is widely recognized as an international thought leader in the field of Sustainability Metrics and Methodology Development. He also published important studies on sustainable consumption, rebounds, and product service systems methodology. He also initiated the development of the world’s most widely used LCA software, SimaPro. His topic will be "Development and Implementation of Social Metrics in a

Large Company", let's welcome Mr. Goedkoop.

3.

Myself

4.

The last presenter in this session is Julien Boisseau, he is currently a Research Engineer at France Telecom Japan, who also held both master degrees at Keio University (Earth Science / Geochemistry) and Centrale Paris (Environmental Science), his presentation is entitled "Social Impact Index for ICT Services - CaseStudy in Emerging Countries", let's welcome him.

S1-2

1.

The first presenter for this session is Ibrahim Olayinka JIMOH (Nigeria), Mr. JIMOH is a Lecturer at Federal University of Technology, Minna, Nigeria. He holds a Master of Science degree in Civil Engineering from University of Ibadan, Nigeria and Bachelor of Engineering degree from University of Ilorin, Nigeria. His area of specialization include Civil, Water resources and Environmental Engineering, his topic today is "Life Cycle Management of Timber Sawmill Wastes in Minna, Nigeria", let's welcome him.

2.

Our next presenter is Associate Professor Damien GIURCO from University of Technology (Australia), he's the Research Director of Institute for Sustainable Futures, Concurrently, he is Research Director for the thematic area of Resource Futures. Professor GIURCO has worked collaboratively with government and industry clients spanning the minerals, water, waste and energy sectors to create change towards sustainable futures. His topic is "Mineral and Energy Futures: Implications forTechnology and Policy in Producing andConsuming Countries", let's welcome Professor GIURCO.

3.

Next presenter will be Paola Karina Sanchez Ramirez who is a PhD student at Gabriele D'Annunzio University of Chieti Pescara (Italy), her topic is "Subcategory Assessment Method for Social LCA: Application for Workers in Cocoa Soap Natura"

4.

The last presenter in this session will be Mr. Robert ILG(Germany)University of Stuttgart, Mr. Ilg is a researcher of The department Life Cycle Engineering (GaBi)-Diplom-Ingenieur (German equivalent of M.S. degree) , and his Research and Task Focus on Life Cycle Engineering / Life Cycle Assessment, especially in the

aircraft industry. He will introduce "Systematic Approach for the Comparison of Sustainability Assessment Methods in the Aviation Sector" for us. Let's welcome Mr. ILG.

(八) 海報發表場次(節錄)

Poster Program

P-001	S1	Study on Impact Factors of CO2 Emission in Shanghai, China Jinling FEI (Japan) Nagoya University
P-002	S1	Recent Efforts to Promote Craftwork Design in Taiwan Chiu Hsueh LIU (Taiwan/R.O.C.) National Yunlin University of Science and Technology
P-003	S1	A Survey of Current Condition and Willing on Sustainable Product Design and Development under Corporate Social Responsibility Yu Chen HUANG (Taiwan/R.O.C.) National Yunlin University of Science and Technology
P-004	S1	Strategy of Sustainable Product Design under Green Supply Chain with the Energy-Using Product-Consumer Electronic Product as Example Jui che TU (Taiwan/R.O.C.) National Yunlin University of Science and Technology
P-005	S1	Strategy of Sustainable Product Design and Development from Environmental Life Style and Green Consumption Standpoint-MUJI as Example Yun-Sian JHANG (Taiwan/R.O.C.) National Yunlin University of Science and Technology
P-006	S1	Strategic Environmental Assessment of Taiwan's Sustainable Energy Development Policy Ya-Hua YU (Taiwan/R.O.C.) National Taipei University
P-007	S1	Life Cycle Assessment of End of Life of Personal Computer and Recycling Feasibility in Thailand Tatthap - VEERATAT (Thailand) Graduate School Chulalongkorn University
P-008	S1	Evaluation the Environment Impacts for End-of-Life (EOL) of E-Waste:Case Study Mobile Phones in Thailand Witthawin SANGPRASERT (Thailand) Chulalongkorn University
P-009	S1	Development Strategy of Coastal Wetlands in the Perspective of Biodiversity Conservation-The Example of Funyuang Wetland in Taiwan PO-JEN SHUAI (Taiwan/R.O.C.) National Taipei University

P-010	S1	Comprehensive Life Cycle Assessment for Cheese and Whey Products in U.S. Greg J THOMA (U.S.A.) University of Arkansas
P-011	S1	Revising Taiwan's Sustainability Development Indicator System with Incorporation of Vulnerability Assessment on Climate Change Wen-Chi YANG (Taiwan/R.O.C.) National Taipei University
P-012	S1	A Study of Relationship between Green Product Recognition and Green Brand Marketing and Green Consumption Jui-Che TU (Taiwan/R.O.C.) National Yunlin University of Science and Technology
P-013	S1	A Study on the Methodology for Evaluating the Environmental Load of Rail Infrastructure Construction Yasutomo MORITA (Japan) Institution for Transport Policy Studies
P-014	S1	Advances in Knowledge Organization Related to Sustainability Science: Prospects for Research and Application Harald Ernst OTTO (Italy) Polytechnic University of Marche
P-015	S1	Sustainable Product Design Checklist: Integrating Sustainability into Early Stages of Product Development Ali MASOUDI (Korea) Pohang University of Science and Technology
P-016	S1	Development of Evaluation Tool for Life Cycle CO2 of Detached Houses Kosuke MEGURO (Japan) Keio University
P-017	S1	Estimation of TBL Indexes for Ark Shell Fisheries Industries in Sendai Bay -Toward Development of Evaluation Method for Sustainable Fisheries- Kazuhito WATANABE (Japan) Miyagi Prefecture Fisheries Technology Institute
P-018	S1	Impact of the Introduction of Biomass Energy to Environment, Economic and Rural Development in ASEAN Region Hendrawan - - (Japan) Tokyo University of Science
P-019	S1	Assessing the Environmental and Social Effects of Free Trade Agreement through Life Cycle Sustainability Analysis:A Case Study of Economic Cooperation Framework Agreement between Taiwan and China Chia-Wei CHAO (Taiwan/R.O.C.)

P-090	S8	WEEE Recycling Impact Assessment in Taiwan by Waste Input Output Analysis Model Pei Chieh HSU (Japan) Waseda University
P-091	S8	Assessment of Energy Efficiency for Industrial Symbiosis-The Case in Southern Taiwan Lu Guan LIN (Taiwan/R.O.C.) Nation Taipei University
P-092	S8	Development of End of Life Vehicle Recycling System for the Efficient Use of Steel Alloying Elements Hajime OHNO (Japan) Tohoku University
P-093	S8	Additionality Analysis of CDM Projects of Chinese Cement Industry Based on Life Cycle Assessment Wenyu ZHANG (Japan) Tohoku University
P-094	S8	Chemical Form of Metal in Landfills and its Temporal Change Manami OKUNO (Japan) Waseda University
P-095	S8	Clarifying Metal-Enriched Zones in Landfills, Using Resistivity and Induced Polarization Measurements Toshinori SAKURAMA (Japan) Waseda University
P-096	S8	Assessing the Recycling Technologies of Tomorrow Jan Paul LINDNER (Germany) Fraunhofer IBP
P-097	S8	An Appropriate Comminution Method for Recycling of Wasted Circuit Boards Kazuki TAHARA (Japan) Waseda university
P-098	S8	Eco-Efficiencies of Rare Metals Recovered from Spent Batteries Kyounghoon HAN (Korea) Konkuk University
P-099	G01	Picturing a Multi-Sectoral Economy in terms of Iron Element Chen LIN (China) Shandong University

(九) 口頭發表簡報資料(王彬墀)

Pin-Chih Wang, Prof. Yuh-Ming Lee and Prof. Chiu-Yang Chen

COMPARISON AND INTEGRATION OF HUMAN DIMENSION'S INDICATORS FOR WELFARE AND HAPPINESS

Presenter
Pin-Chih Wang
PhD student / R. Assistant
National Taipei University

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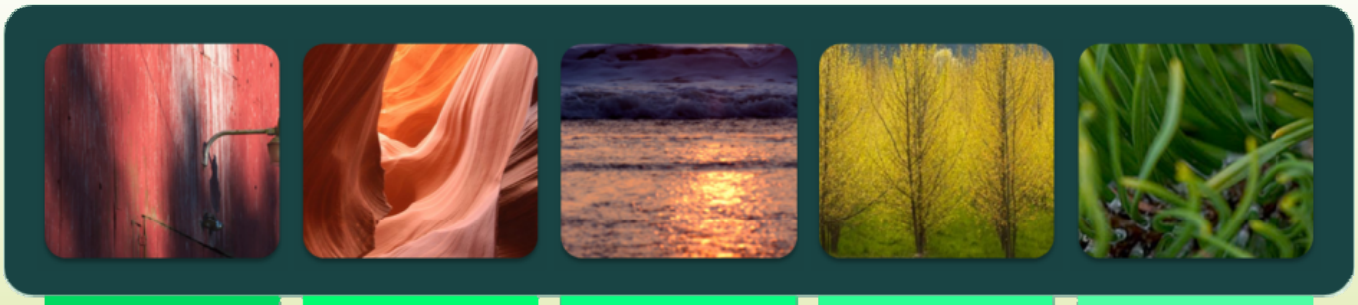
Outlines



- Preface and Introduction
- Review and some data facts
- Characteristics and process
- Integration and Establishment of Aggregated Indicators
- Conclusion

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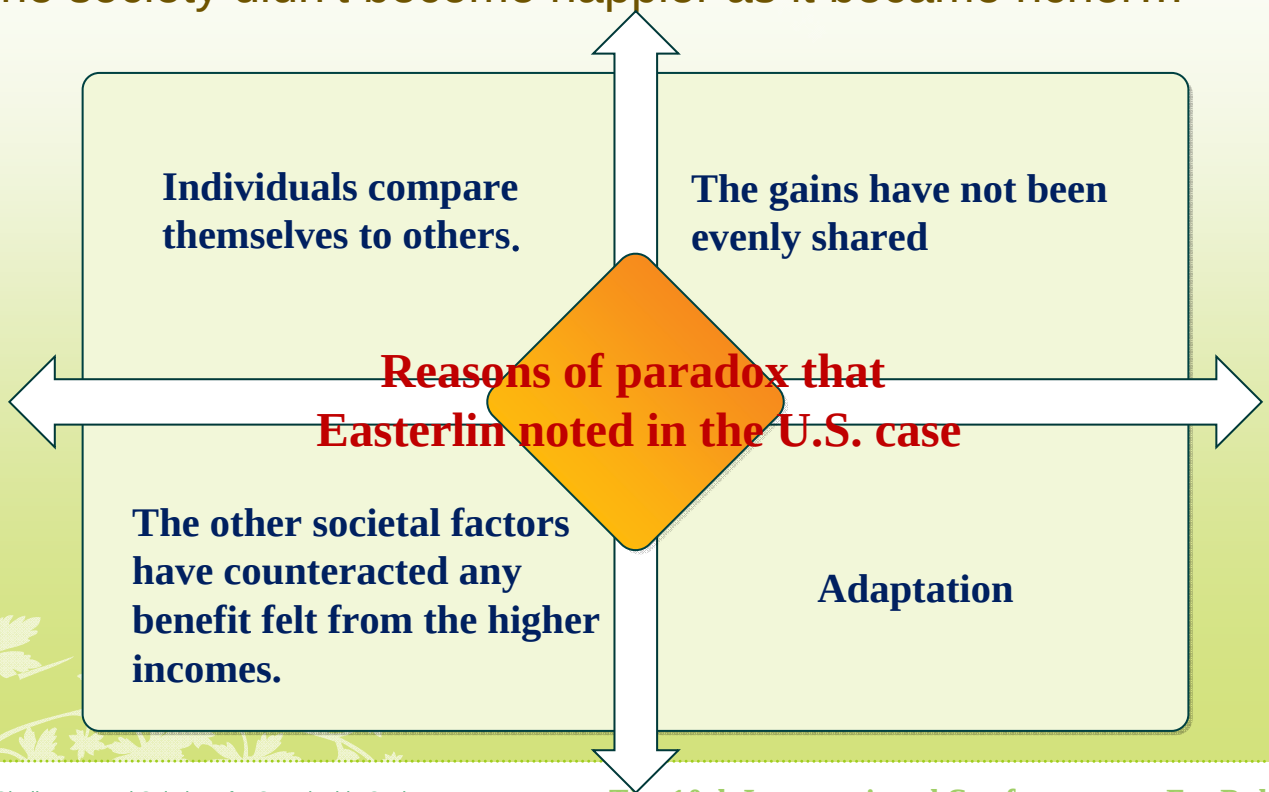
Preface

- Absolute or relative income in determining happiness?
  - Easterlin Paradox (Richard A. Easterlin, 1974, "*Does Economic Growth Improve the Human Lot? Some Empirical Evidence*.")
  - Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox (by Betsey Stevenson and Justin Wolfers)
- Welfare economics, Happiness economics…
- After the end of poverty, what comes next…
- Rethink the meaning of well-being (physiological, psychological…substantial, spiritual)
- Foster the happiness of citizens…

Introduction

- The society didn't become happier as it became richer…



Introduction

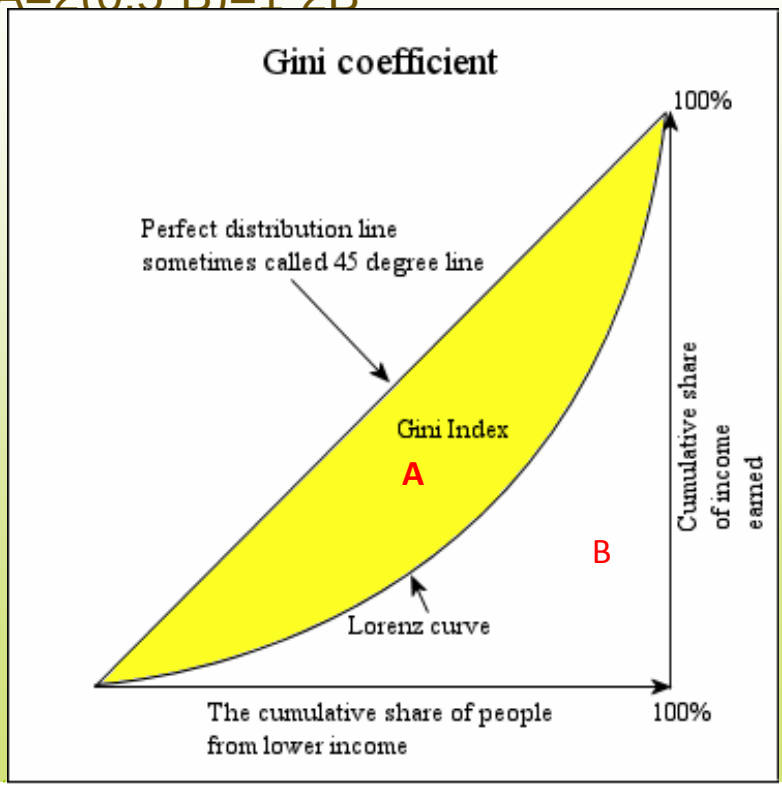
- Gini coefficient / Gini Index
  - most widely used measure of income inequality that defined as a ratio, between 0 and 1.
- Human Development Index (HDI)
  - UNDP Human Development Reports
- Gross National Happiness (GNH)
  - developed by the Center for Bhutan Studies, Kingdom of Bhutan
- Your Better Life Index (BLI 2.0)
  - the OECD Better Life Initiative
- Inclusive Wealth Index (IWI by IHDP), Happy Planet Index (HPI, by nef)...not included

Review and some data facts

- Gini coefficient=A/(A+B)=2A=2(0.5-B)=1-2B

- If the Lorenz curve is represented by the function Y = L(X), the value of B can be found with integration and:

$$G = 1 - 2\int_0^1 L(X)dX$$



Review and some data facts

- Income Distribution in Selected Countries

Countries	Year	Gini coefficient
A. Per household		
Hong Kong	2011	0.537
Japan(a)	2011	
Taiwan	2011	0.342
U.S.A	2009	0.388

B. Per capita			
Brazil	2009	0.547	
Canada	2000	0.326	
China	2005	0.425	
Colombia	2010	0.559	
Finland	2000	0.269	
France	1995	0.327	
Germany	2000	0.283	
Italy	2000	0.360	
Japan(b)	2009	0.313	
Korea, Rep.	2011	0.311	
Luxembourg	2000	0.308	
Netherlands	1999	0.309	
Malaysia	2009	0.462	
Mexico	2010	0.477	
New Zealand	1997	0.362	
Norway	2000	0.258	
Taiwan	2011*	0.296	
	2011**	0.283	OECD
Singapore(a)	2011	0.482	
Singapore(b)	2011	0.452	
Sweden	2000	0.250	
United Kingdom	2010	0.380	

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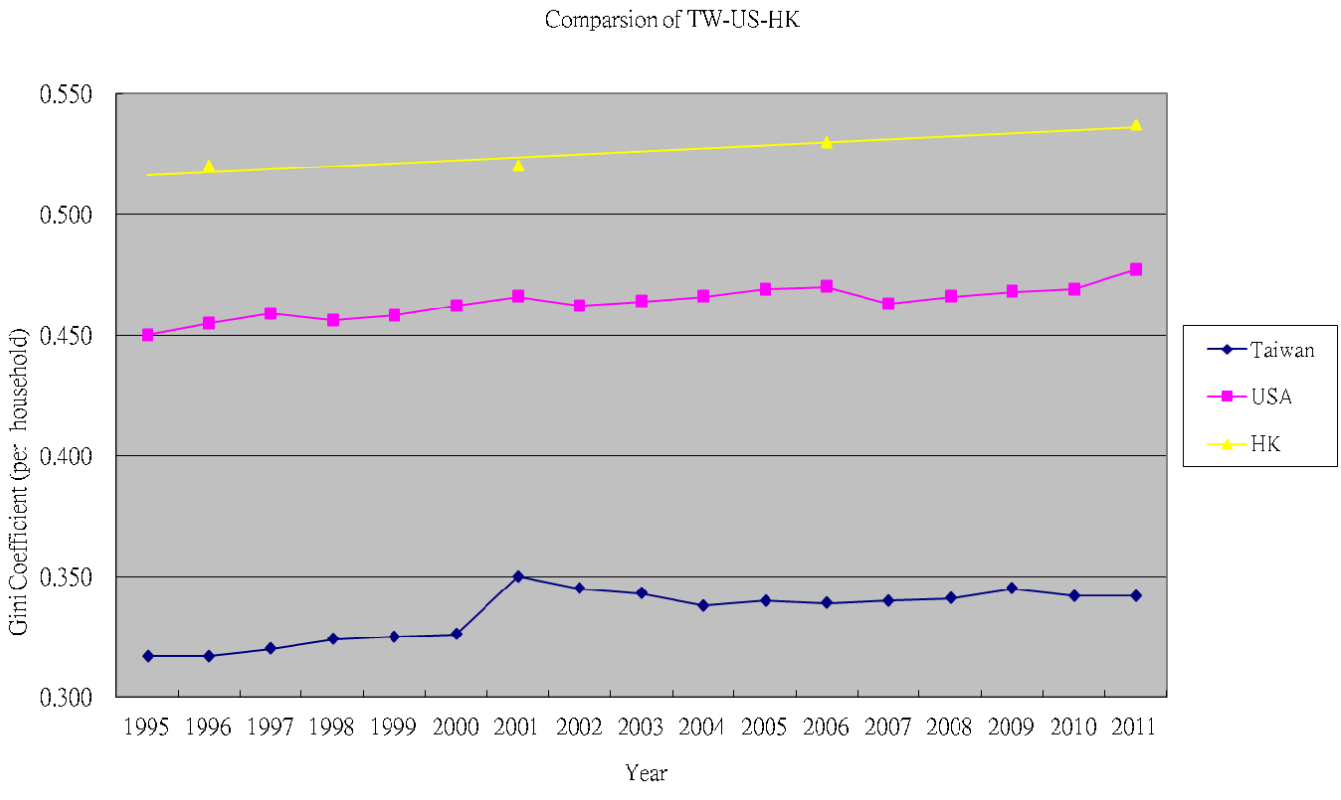
Review and some data facts



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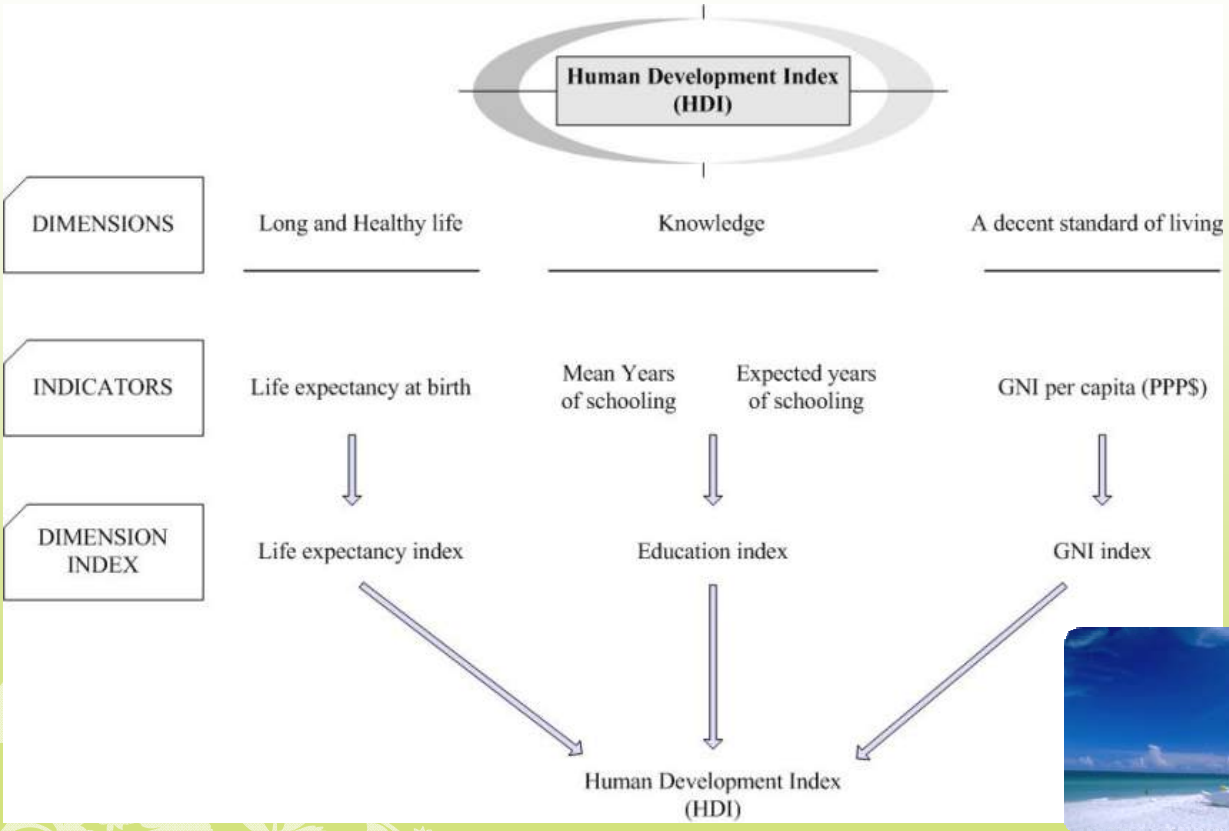
Review and some data facts



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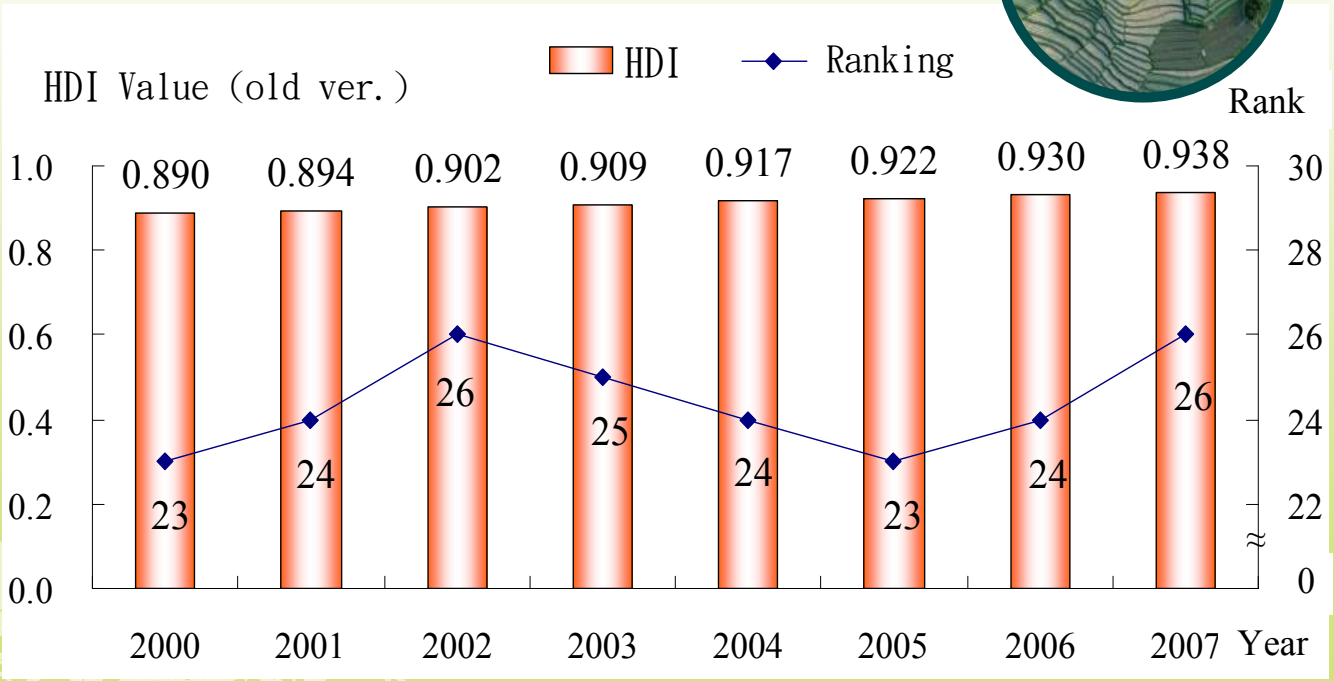
Review and some data facts

- Result with HDI old version in last few years



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Review and some data facts

1. Minimum and Maximum (Year 2010 for example)

	Life expectancy at birth (years)	Mean years of schooling (Years that a 25-year-old person or older has spent in schools) (years)	Expected years of schooling (Years that a 5-year-old child will spend with his education in his whole life) (years)	GNIpc: Gross national income at purchasing power parity per capita (PPP$)	Education Index (EI)
Min	20	0	0	163	0
Max	83.2	13.2	20.6	108,211	0.951

2. Transform into indices

- Life Expectancy Index (LEI)=(actual value -min)/(max-mmin)
- Mean Years of Schooling Index (MYSI) =(actual value -min)/(max-mmin)
- Expected Years of Schooling Index (EYSI)= (actual value -min)/(max-mmin)
- GNI Index

$$W(y) = \frac{\ln y - \ln y_{\min}}{\ln y_{\max} - \ln y_{\min}}$$

y：actual value

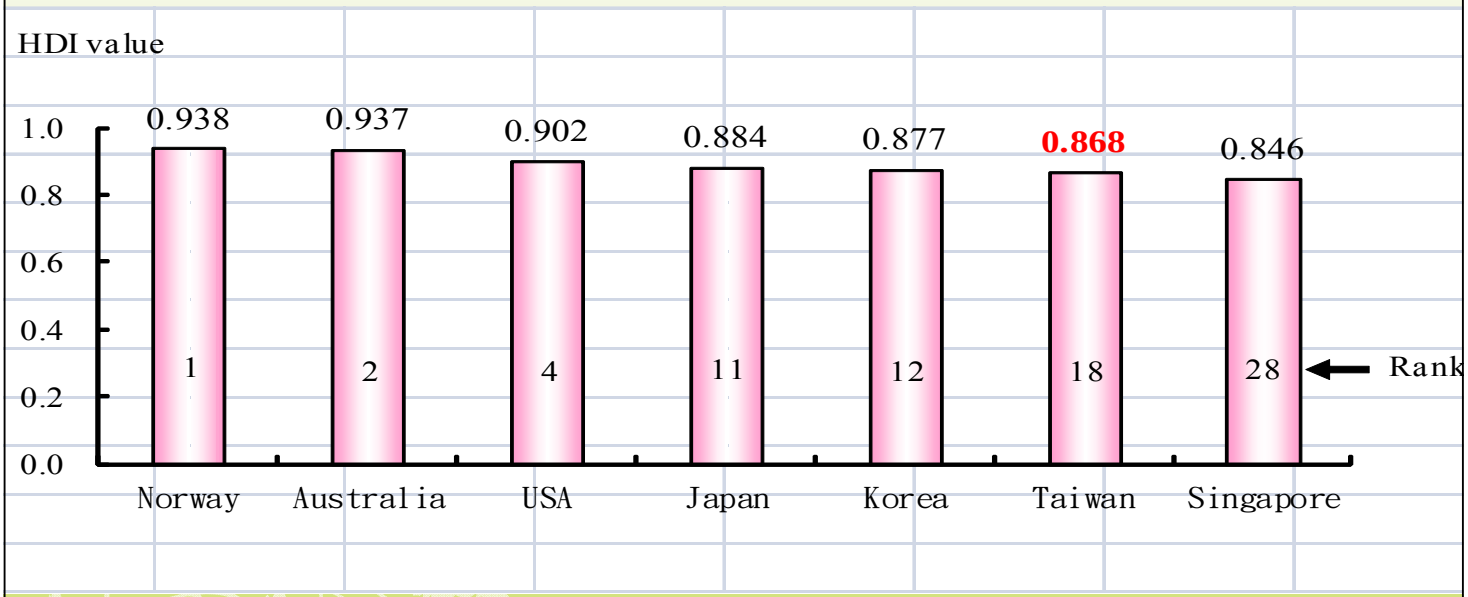
3. Education Index (EI)

$$\left(\sqrt{\text{Mean years of schooling} \cdot \text{Expected years of schooling}} - \min\right) / \left(\max - \min\right)$$

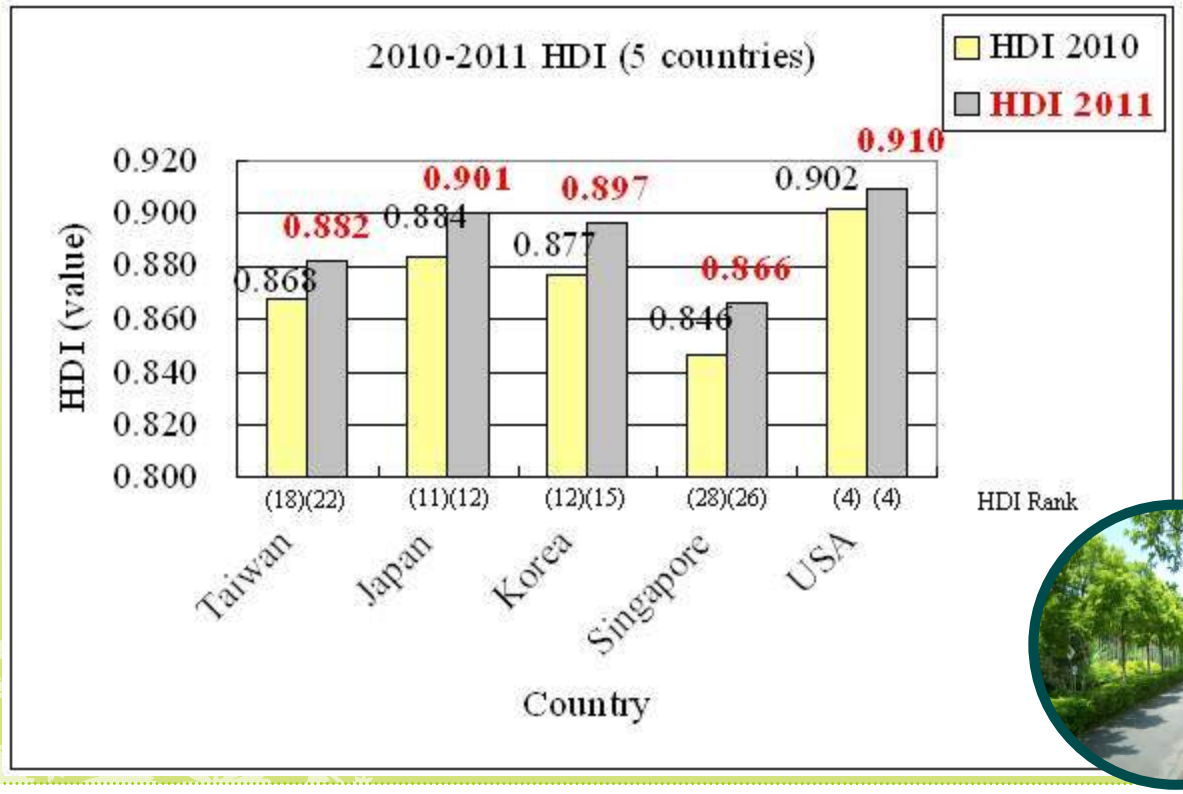
4. The HDI is the geometric mean of the previous three normalized indices

Review and some data facts

- Result with HDI new version in 2010



Review and some data facts



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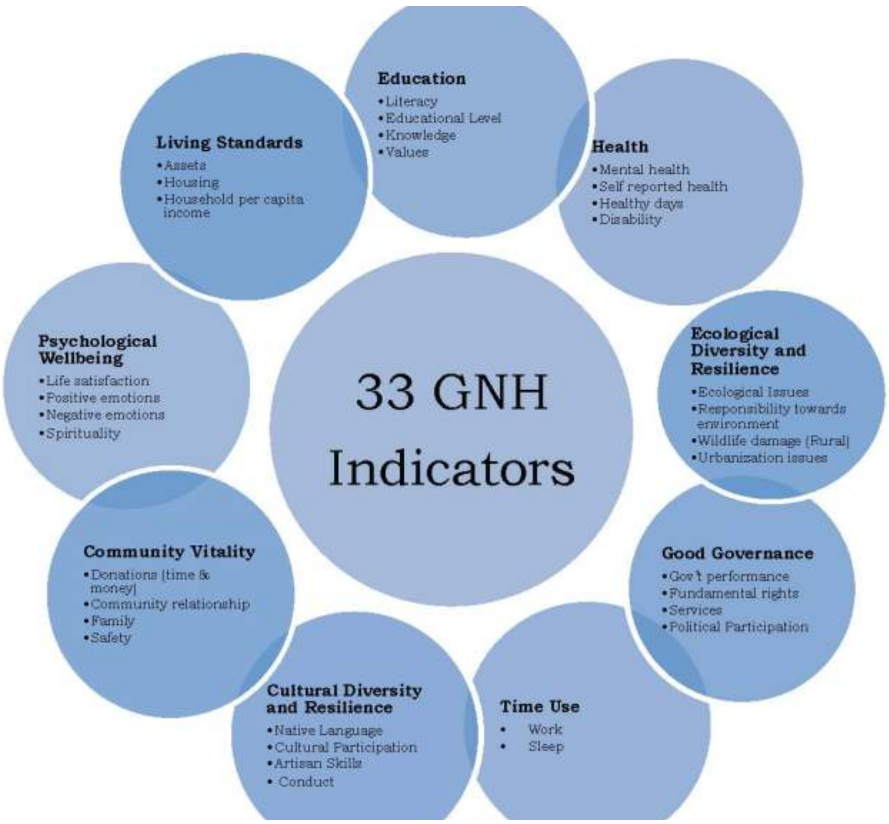
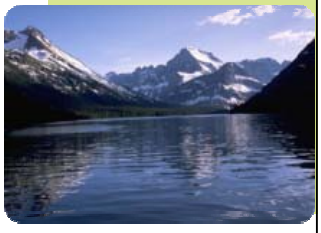
Review and some data facts



The 9 domains and 33 indicators of the GNH



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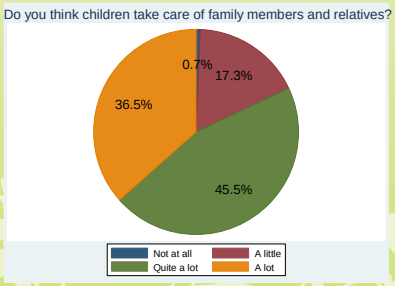
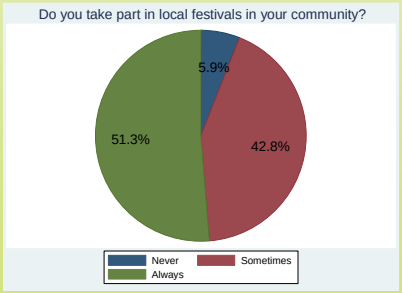
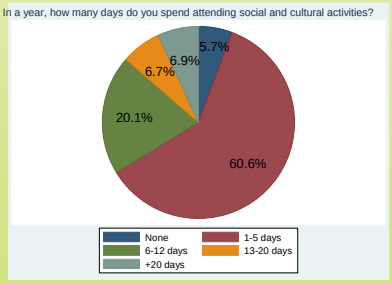
Review and some data facts

- GNH variables (example for Cultural diversity and resilience)

Domain	Indicator	Sub-indicator	Question	Response range (worst-best)	Threshold
Cultural diversity and resilience	Speak native language	Ability to speak mother tongue	How well can you speak your mother tongue now?	1 (Not at all)-4 (Very well)	4 (Quite well) or 5 (Very well)
	Cultural participation	Number of days participated in socio-cultural activities	How many days do you spend in a year attending social and cultural acitivities (community festivals or *choku* of neighbours)?	1 (None)-5 (More than 20 days)	3 (6-12 days) or 4 (13-20 days) or 5 (More than 20 days)
	Zorig chusum skills (Artisan skills)	Artisan skills	Do you have any of the *zorig chusum* skills?	0 skill (Worst)-13 skills (Best)	One skill or more
	Driglam Namzha (code of et	Attitude	Is Driglam Namzha important?	Not Important)-3(Very Importa	(Important) & 3 (Getting
		Change over time	practice and observance of Driglam	etting weaker)-3 (Getting stron	stronger)







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Review and some data facts

Domain	Indicators	Individual indicator weight: Fraction form	Individual indicator weight: Percentage form	Domain weight	Total weight: Fraction form	Total weight: Decimal form
Psychological wellbeing	Life satisfaction	1/3	40%	1/9	1/27	0.037037
	Positive emotion	1/6	10%	1/9	1/54	0.018519
	Negative emotion	1/6	10%	1/9	1/54	0.018519
	Spirituality	1/3	40%	1/9	1/27	0.037037
Health	Self reported health status	1/10	10%	1/9	1/90	0.011111
	Number of healthy days	3/10	30%	1/9	1/30	0.033333
	Disability	3/10	30%	1/9	1/30	0.033333
	Mental health	3/10	30%	1/9	1/30	0.033333
Time use	Work	1/2	50%	1/9	1/18	0.055556
	Sleep	1/2	50%	1/9	1/18	0.055556
Education	Literacy	3/10	30%	1/9	1/30	0.033333
	Schooling	3/10	30%	1/9	1/30	0.033333
	Knowledge	1/5	20%	1/9	1/45	0.022222
	Value	1/5	20%	1/9	1/45	0.022222
Cultural diversity and resilience	*Zorig chusum skills* (Artisan skills)	3/10	30%	1/9	1/30	0.033333
	Cultural participation	3/10	30%	1/9	1/30	0.033333
	Speak native language	1/5	20%	1/9	1/45	0.022222
	Driglam Namzha (code of etiquette and conduct)	1/5	20%	1/9	1/45	0.022222
Good Governance	Political participation	2/5	40%	1/9	2/45	0.044444
	Services	2/5	40%	1/9	2/45	0.044444
	Governance performance	1/10	10%	1/9	0/1	0.011111
	Fundamental rights	1/10	10%	1/9	1/90	0.011111
Community vitality	Donation (time & money)	3/10	30%	1/9	1/30	0.033333
	Safety	3/10	30%	1/9	1/30	0.033333
	Community relationship	1/5	20%	1/9	1/45	0.022222
	Family	1/5	20%	1/9	1/45	0.022222
Ecological diversity and resilience	Wildlife damage	2/5	40%	1/9	2/45	0.044444
	Urban issues	2/5	40%	1/9	2/45	0.044444
	Responsibility towards environment	1/10	10%	1/9	1/90	0.011111
	Ecological issues	1/10	10%	1/9	1/90	0.011111
Living Standard	Household per capita income	1/3	33%	1/9	1/27	0.037037
	Assets	1/3	33%	1/9	1/27	0.037037
	Housing	1/3	33%	1/9	1/27	0.037037
	Total	9/1			1/1	1.000000

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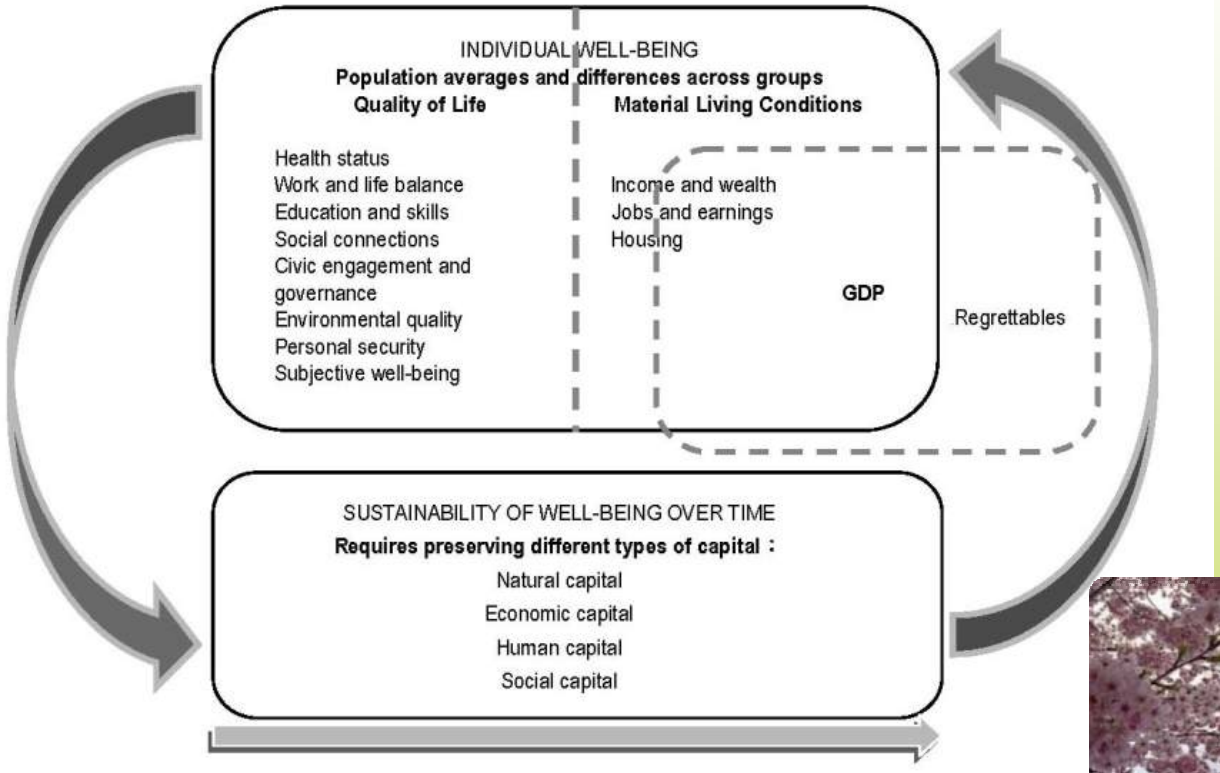
Review and some data facts

Framework for OECD well-being indicators



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Review and some data facts

- Your Better Life Index/BLI 2.0 (2012 ver.): including 11 dimensions and 24 indicators.

Topics	Indicators
Housing	Rooms per person
	Dwelling with basic facilities
	Housing expenditure
Income	Household disposable income
	Household financial wealth
Jobs	Employment rate
	Long-term unemployment rate
	Personal earnings
	Job security
Community	Quality of support network
Education	Educational attainment
	Years in education
	Students skills in math, reading and science
Environment	Air pollution
	Water quality
Civic engagement	Voter turnout
	Consultation on rule-making
Health	Life expectancy
	Self-reported health
Life Satisfaction	Life Satisfaction
Safety	Homicide rate
	Assault rate
Work-life balance	Employees working very long hours
	Time devoted to leisure and personal care

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Review and some data facts

- 34 OECD members + Russia + Brazil
- China, India, Indonesia and South Africa will be added in the future.

	Income		Jobs				Housing			Work-life balance		Health	
COUNTRY	Households' income	Household financial wealth	Employment rate	Personal earnings	Job security	Long-term unemployment rate	Rooms per person	Housing expenditure	Dwellings with basic facilities	Employees working very long hours	Time devoted to leisure and personal care	Life expectancy	Self-reported health
Australia	54844 USD		83%	82202 USD	7.61%	0.53%		21%		13.99%	14.41 hours	81.8 years	93%
Japan	46436 USD		75%	61431 USD		1.22%	1.8 rooms	23%	93.60%		13.96 hours	83 years	35%
Korea	31723 USD		77%	64229 USD	13.10%	0.01%	1.4 rooms	16%	95.84%		14.63 hours	80.7 years	42%
Russian Federation	33916 USD							11%		0.17%		69 years	
United Kingdom	55138 USD			81762 USD	4.81%	1.43%	1.8 rooms	23%	99.50%	11.71%	14.83 hours	80.4 years	
United States	81878 USD		83%	109508 USD	11.38%	1.22%		20%	100%	10.86%	14.27 hours	78.7 years	96%

	Education			Community	Civic engagement		Environment		Safety		Life Satisfactio
COUNTRY	Educational attainment	Years in education	Students' skills	Social network	Consultation on rule-making	Voter turn-out	Water quality	Air pollution	Homicide rate	Assault rate	Life Satisfaction
Australia	71%	18.4 years	569 score	99%	10.5 index	96%	95%	14 micrograms	1.2 homicides	1.52%	7.8 rate
Japan			567 score	86%	7.3 index	67%	86%	27 micrograms	0.5 homicides	1.26%	6.3 rate
Korea	80%	17.2 years	581 score	87%	10.4 index	91%	81%	31 micrograms	2.8 homicides	1.94%	7.8 rate
Russian Federation	88%	16.6 years	516 score	86%		67%	50%	16 micrograms	11.2 homicides	0.74%	5.8 rate
United Kingdom	74%	16.3 years	556 score	96%	11.5 index	64%	96%	13 micrograms	1.2 homicides	3.06%	7.2 rate
United States	89%	16.9 years	559 score	95%	8.3 index	100%	89%	19 micrograms	5 homicides	0.75%	7.6 rate

- Your Better Life Index allows you to put different weights on each of the topics, and decide for yourself what contributes most to well-being. It also helps show how prioritising specific issues of well-being affects the overall picture

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Characteristics & process

Gini coefficient

Gini coefficient (Gini Index) measures income inequality at country level

HDI

Human Development Index is a composite index used measure of achievements in fields of health, education and economy, which aims at "Going beyond GDP" of country level.

GNH

Gross National Happiness measure has been designed to fulfill the various criteria that are needed for an official national measure of happiness that is relevant to national and district policy

BLI 2.0

Your Better Life Index cares about environment and life satisfaction without subsuming topic of culture.

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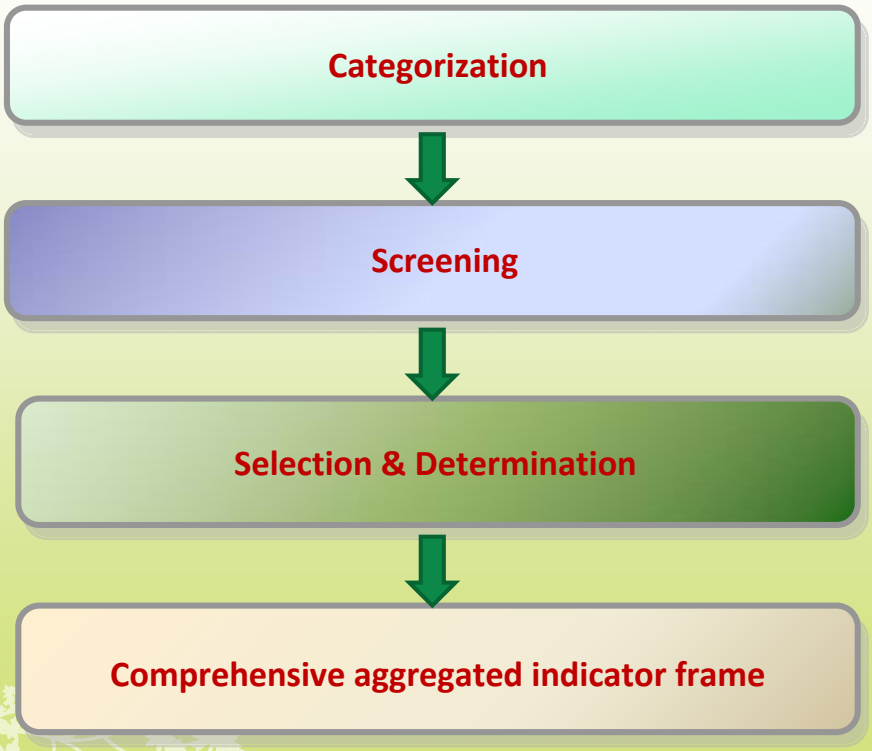
Characteristics & process



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Integration and Establishment of Aggregated Indicators

- **Key dimension should be considered** (by the Commission on the Measurement of Economic Performance and Social Progress)
  - Material living standards;
  - Health;
  - Education;
  - Personal activities including work;
  - Political voice and governance;
  - Social connections and relationships;
  - Environment
  - Insecurity, of an economic as well as a physical nature.

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Integration and Establishment of Aggregated Indicators

- Principles of Screening

Availability & flexibility

- Have face validity
- Are amenable to change and sensitive to policy interventions

Acceptance & comparability

- Are commonly used and accepted
- Ensure comparability across countries

Coverage & recurrence

- Ensure maximum country coverage
- Are collected through a recurrent instrument

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Integration and Establishment of Aggregated Indicators

- Recommendation of aggregated Indicator Frame

Dimension	Indicators
Standard of living	Gini coefficient
	GNI per capita
	Household disposable income
	Household financial wealth
Education and Research	Mean years of schooling
	Expected years of schooling(yrs)
	R&D-to-GDP ratio
Health	Life expectancy at birth
	Self-reported health status
	Mental health
Governance & Civic engagement	Voter turnout
	Governance performance
	Human rights
Psychological wellbeing	Life Satisfaction

Dimension	Indicators
Environment	Air pollution
	Water quality
	Natural disaster
Safety	Homicide rate
	Imprisonment rate
	Motor Vehicle Accident Death Rates
Employment	Employment rate
	Unemployment rate
	Average wage
Community	Quality of supporting community care network
	Culture vitality

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Conclusions

■ Psychological wellbeing

■ Time use

■ Safety

■ Governance & Civic engagement

■ Employment

■ Community

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Conclusions

- Nevertheless, indicators mentioned above still fail to reflect the state of **natural resources** or **ecological conditions** and both focus exclusively on the short term, without indicating whether national policies are sustainable over longer periods of time.

- The Inclusive Wealth Index, IWI (IHDP)
  - which measures the wealth of nations by looking into a country's capital assets, including **manufactured, human and natural capital**, and its corresponding values.
- Guidelines on the Measurement of Subjective Well-being (OECD)
- Since all measures of well-being are imperfect, the best approach is to use a range of different measures, including conventional national accounting indicators.

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THANK YOU

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●Research interests:
✓Environmental Systems Analysis
✓Life Cycle Assessment and Environmental Management Systems
✓Industrial Ecology and Materials Flow Analysis
✓Social Life Cycle Assessment: Products and Application