



Multi-Regional Environmental IO Tables: Progress of the CREEA project

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Presentation Elements

- › Multi-regional EE SUT and IOT
 - › What is EE MRIO
 - › Overview of MRIO datasets
 - › Overview of CREEA project
 - › Future collaboration?



So what you need: detailed Multi-Regional EE SUT SUT/IOT

- › Ideal solution: a database that links country SUT/IOT via trade
- › Country SUT/IOT including value added and final demand (red)
- › Import and export trade matrices for intermediate and final demand (green)
- › Extensions: emissions, energy, materials (grey)
- › Preferably with detail in environmentally relevant sectors..
- › ..and many emissions/extensions

		Industries				$Y_{*,A}$	$Y_{*,B}$	$Y_{*,C}$	$Y_{*,D}$	q
Products		$Z_{A,A}$	$Z_{A,B}$	$Z_{A,C}$	$Z_{A,D}$	$Y_{A,A}$	$Y_{A,B}$	$Y_{A,C}$	$Y_{A,D}$	q_A
		$Z_{B,A}$	$Z_{B,B}$	$Z_{B,C}$	$Z_{B,D}$	$Y_{B,A}$	$Y_{B,B}$	$Y_{B,C}$	$Y_{B,D}$	q_B
		$Z_{C,A}$	$Z_{C,B}$	$Z_{C,C}$	$Z_{C,D}$	$Y_{C,A}$	$Y_{C,B}$	$Y_{C,C}$	$Y_{C,D}$	q_C
		$Z_{D,A}$	$Z_{D,B}$	$Z_{D,C}$	$Z_{D,D}$	$Y_{D,A}$	$Y_{D,B}$	$Y_{D,C}$	$Y_{D,D}$	q_D
W		W_A	W_B	W_C	W_D					
g		g_A	g_B	g_C	g_D					
C & L		C_A	C_B	C_C	C_D					
		L_A	L_B	L_C	L_D					
Environ Ext		$NAMEA_A$	$NAMEA_B$	$NAMEA_C$	$NAMEA_D$					
		$Agric_A$	$Agric_B$	$Agric_C$	$Agric_D$					
		$Energy_A$	$Energy_B$	$Energy_C$	$Energy_D$					
		$Metal_A$	$Metal_B$	$Metal_C$	$Metal_D$					
		$Mineral_A$	$Mineral_B$	$Mineral_C$	$Mineral_D$					
		$Land_A$	$Land_B$	$Land_C$	$Land_D$					



Major (research) initiatives in creating (Global) MR EE SUT/IOT

Database name	Funding	Countries	Type	Detail (ixp)	Time	Extensions	Approach
GTAP (Peters, Hertel)	Subscription, own res.	World (129)	MR IOT	57x57	1990-2010 (1997, 2001, 2004, 2007)	5 (GWP)	Harmonize trade, use IOT to link trade sets, IOT balanced with trade and macro-economic data
GRAM (SERI)	Own research and pETRE project	World (40)	MR IOT	48x48	2000, 2004	Various	Use harmonized OECD IOT, neglect differences like ixi and ppx, use OECD Bilateral trade database to trade link.
IDE JETRO (Inomata)	Japan	Asia Pacific (10)	MR IOT		2000, 2004	-	Harmonize IOT; Link via trade, move discrepancies to RoW
WIOD (Dietzenbacher, RUG)	EU FP7	World (40)	MR SUT	35x59	1995-2007	20+ (including CO2)	Harmonize SUT, Link via trade, RAS out differences
EXIOPOL & CREEA (Tukker, TNO & NTNU)	EU FP6/7	World (43+RoW)	MR SUT	129x129; 160x180	2000, 2007	30 emissions, 60 IEA energy carriers, water, land, 80 resources	Create SUT bp, Spilt Use_dom and Use_imp, Detail and harmonize SUT, use trade shares to estimate implicit exports, confront with exports in SUT, RAS out differences, add extensions
AISHA/EORA (Lenzen, Univ.. Sydney)	Australian NSF	World (around 150)	MR SUT/ IOT	Variable (20-500)	1990-2009	Various	Create initial estimate, gather all data in original format, formulate constraints, detect and judge inconsistencies. Let routine calculate global MR SUIOT

Note: WIOD seems only project that develops current and constant price tables



The contribution of EXIOPOL and CREEA

› EXIOPOL

- › Unique detail and large number of extensions

- › Focused on environmentally relevant sectors (agri, energy, mining, etc.)

› FP7 CREEA (Compiling and Refining Economic Environmental Accounts)

- › WP1/2 = Management and scoping

- › WP 3 Will improve water and land use accounts

- › WP 4 Will expand EXIOPOL/EXIOBASE with physical accounts

- › Will further test SEEA 2012 forest (WP5) and carbon (WP6) accounts

- › Used to update EXIOBASE to 2007 (WP7) and do case studies (WP8)

- › We have funds reserved for intensive collaboration with formal circles
(WP9: e.g. OECD, UNCEEA, UNEP ????)

- › Partners TNO, CML, WI, SERI, EU DG JRC IPTS, NTNU, 2-0 LCA, ETH, TU
Twente (Water Footprint), CBS, SCB, EFI

- › Have obviously NSIs in Advisory Boards



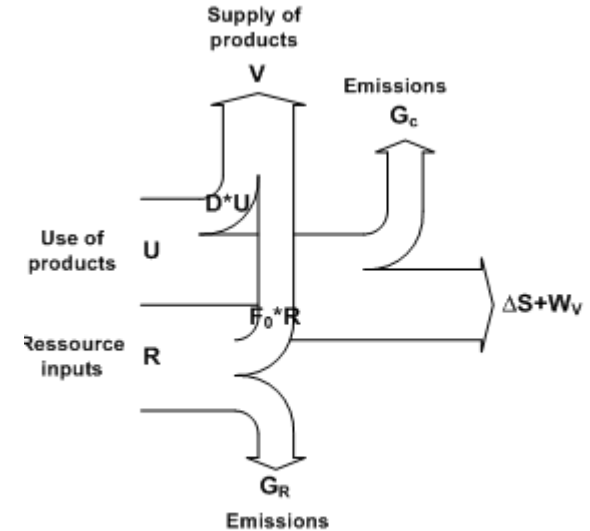
What we do by WP: WP3, water accounts

- Task 1: definitions > bridge statistical with academic community
 - Test various PSUT format
- Task 2: quality accounts
 - Extend the grey water footprint concept
 - Life Cycle Impact Assessment
 - Cooling water pollution
- Task 3: valuation of water
- Task 4: Data collection for EXIObase
 - water extensions (abstraction and consumption) for 160 sectors by country
 - Spatial disaggregation (grid cells / river basins)



What we do by WP: WP4, MFA/Waste accounts

- For each 'cell' in the SUT, we create a physical input-output balance
 - U = material inputs, next to primary resource
 - S , emissions = material outputs
 - Remainder is "waste"..with properties related to U !
- We then add all wastes by type to +/- 20 categories....and distribute them over re-use, landfill, incineration and compare to waste statistics
- Problematic issue is waste from stocks/durable goods; no stock data
- We estimate physical flow using physical data where available and prices





What we do by WP: WP5, Forest accounts

- A literature review
- A survey to forest accounting nations and organisations, with suggestions on indicators that can complement the current forest accounts
- Next steps: To do pilot studies for Germany, Spain and Sweden based on suggestions and reactions on the survey.



What we do by WP: WP6, Kyoto accounts

- Mapping IEA energy database on MR SUT and emission calculation
 - IEA format -> SUT
 - Territorial to residence
 - IEA product classification now harmonized with EXIOBASE 2.0; IEA industries need correspondence with more detailed EXIOBASE
 - Allocation: mix of physical and economic coefficients (latter assuming price homogeneity of Use)
 - UNFCCC emission factors give emissions
 - Other emissions similar approach
- Land use cover change: tested for Annex 1, not certain for others
- Experimental inclusion of Emission trading schemes
- Experimental analysis of response measures (e.g. Taxation, subsidies)
- Assess Environmental goods and services in the climate area



What we do by WP: WP7, Integration in EXIOBASE

- Detailing country SUT
 - Use more detailed sector and product statistics to detail row and column totals
 - Use additional information to estimate per sector supply and use co-efficiency (e.g. similar country, LCI, IEA, Agrisams)
 - Use detailed trade data to split trade
 - ...then harmonize with a RAS alike procedure...or iron out incompatibilities (e.g. there is sure Use, but no domestic Supply nor imports -> imports may be wrong)
- Add extensions, 'peg' energy & physical accounts (part integrated in detailing using price assumptions and using physical supply/use totals)
- Link via trade
 - Distribute imports via trade shares to countries of origin
 - Then usually the implicit exports do not match exports in SUT (mismatch at different levels: total global export // global import; export // import by product globally; exports in country SUT not equal to implicit exports -> there are differences that must be removed!
 - Give slack to trade shares and optimize differences
 - Store inevitable differences in inventories or 'difference' column



What CREEA will create: EXIOBASE 2.0

- A global MR SUT with extensions for 2007
 - 160 sector and 180 products by country
 - Trade linked
 - Not only monetary MR SUT, but also energy MR SUT (probably good, IEA base) and material MR SUT (somewhat problematic)
 - 43 countries and 5 'rest of continents'
 - 80 resources, 30 emissions



Future collaboration between statistical and research community?

- Increasing policy interest in these calculations
- NSIs may need to upgrade their models towards MRIO standards
- MRIO models require huge amounts of data
- Harmonized data is main problem
- Official statistics may get changed considerably during integration (trade linking)
- Significant future challenges ahead for MRIO
 - Implementation of the 2008 SNA
 - ISIC / CPC revisions
- There seems a clear need for enhanced cooperation.
- How can this be facilitated?



How do I see collaboration with you?

1. There seems interest from UN SD, WB, others to work on MR IO
 - › Project partners from EXIOPOL, AISHA, WIOD could help
 - › Sharing e.g. EXIOBASE trade linking routine
 - › Sharing experiences with data harmonization
 - › Cf Eurostat's official EU27 EE SUT build by EXIOPOL&WIOD staff
2. Countries build own EE SUT/IOT but face pollution embodied in trade
 - › A joint WG of NSIs and researchers could link and harmonize such initiatives, compare OECD WG on Material Flow Analysis
 - › CREEA can offer some funds to support this,,,,
 - › ,,would there be interest? What would be a good host ? (e.g. UNCEAA, London Group, UNEP SETAC LCI, OECD....)
3. Support to countries with less data seems feasible too
 - › EXIOPOL, AISHA had to develop many gap filling routines
 - › Crude but usable EE SUT probably can be estimated with FAOSTAT, IEA and macro-economic data



THANKS FOR YOUR ATTENTION!