

G20 INDONESIA 2022

BADAN PUSAT STATISTIK

Interregional Input-Output

COMPILATION OF INDONESIA 2016

sia-Pacific Stats Series: The Compilation of Input and Output Table and the Application in Policy Making

Etjih Tasriah

Senior Statistician/Coordinator

BPS-Statistics Indonesia

tasriah@bps.go.id

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Why do we need to compile IO and IRIO Tables

Sub-regionals economic characteristics and performance are sometime different than their national economy.

The dynamics of a sub-region's economy are usually inseparable from exogenous factors outside the region.

IO

Input-Output table plays a role in analyzing the interrelationships between industries in one region, but cannot analyze the interrelationship between industries in multiregional dimension

There’s a need for more effective analytical tools to informs interrelationship between regional interconnectivity: IRIO

IRIO

The Purpose of Compilation: IO and IRIO Tables

Single-Region IO Table (Provincial)

Provide an overview of the pattern of supply and demand for goods/services in a province

Provide an overview of the production technology (input coefficient) of goods/services in a province

Provide measure of output and income multiplier ***(intraregional/within a province)***

Analyze the impact of changes in demand on the supply system for goods and services, or vice versa, in a province

Provide information that supports other economic analysis in a province

IRIO Table



Provide detail pattern of interregional supply and demand for goods/services in a country



Provide detail view of the interdependency in production technology (input coefficient) of goods/services in between provinces



Provide measures of interregional and intraregional output and income multiplier ***(interrelationship multipliers)***

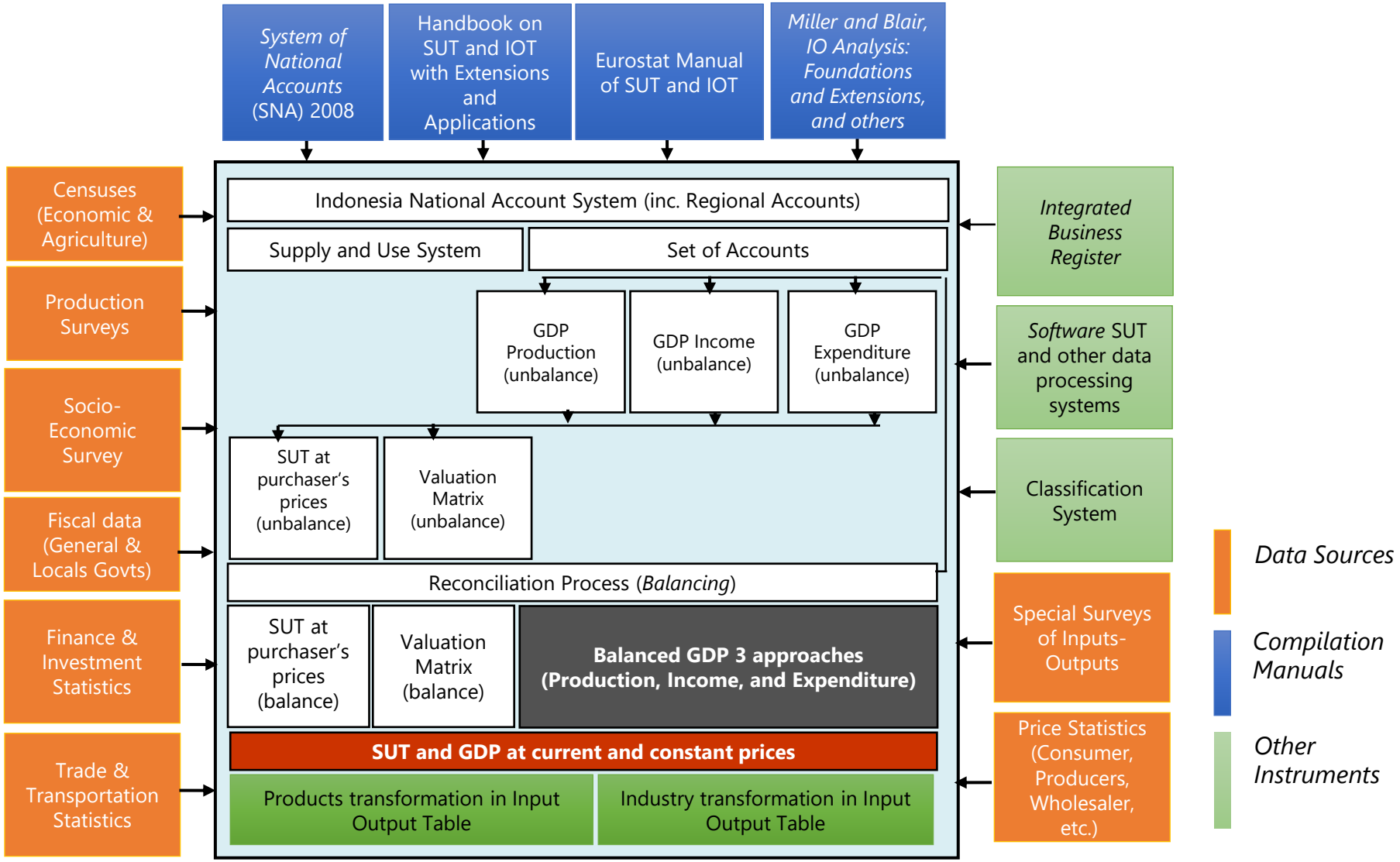


Analyze the impact of changes in demand on the supply system for goods and services, or vice versa, between provinces



Provide information that supports other multi-regional economic analysis in a country

COMPILATION PROCESS: BUILDING BLOCKS

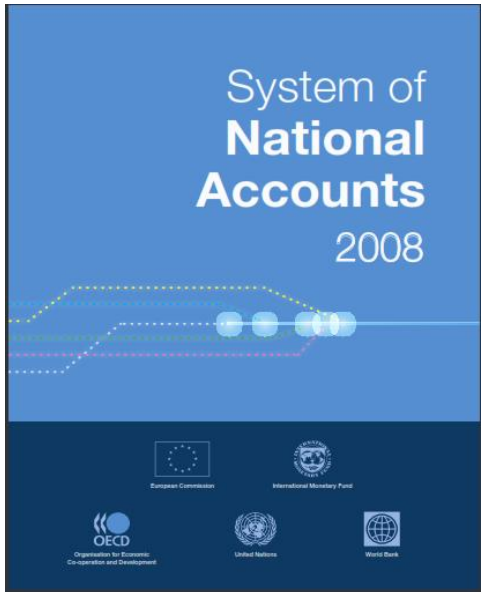


source: Adopted from *Manual of Supply and Use Tables and Input-Output Tables*, EUROSTAT.

SUT AND IO COMPILATION MANUALS

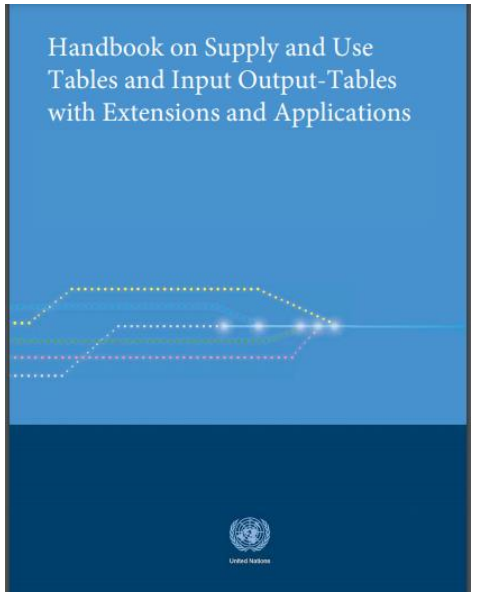
… **the central framework of the SNA also contains detailed supply and use tables in the form of matrices that record how supplies of different kinds of goods and services originate from domestic industries and imports and how those supplies are allocated between various intermediate or final uses, including exports**. These tables involve the compilation of a set of integrated production and generation of income accounts for industries by drawing upon detailed data from industrial censuses or surveys. The supply and use tables provide an accounting framework within which the product flow method of compiling national accounts, whereby the total supplies and uses of individual types of goods and services have to be balanced with each other, can be systematically exploited. **The supply and use tables also provide the basic information for the derivation of detailed input-output tables that may be used for purposes of economic analysis and projections**.

(SNA 2008: 1.24)



… Supply and use tables are an integral part of the SNA and the process of compiling these tables is a powerful way of ensuring consistency between the various data sources available to the compiler. For many analytical purposes, though, a transformation from a pair of supply and use tables into a single input-output table where row and column totals are equal brings very considerable advantages. **Input-output tables cannot be compiled without passing through the supply and use stage (except under very restrictive assumptions)**…

(SNA 2008: 28.2)



The SUTs do not just provide a framework to ensure the best quality estimates of GDP and its components, but also use as the basis for deriving the input-output tables (IOTs).

(Handbook on SUT and IOT: 1.16)

CLASIFICATION SYSTEM

17 & 52 INDUSTRY

65 PRODUCTS

Industri		Rincian
A. Pertanian, Kehutanan, dan Perikanan	1	Pertanian Tanaman Pangan
	2	Pertanian Tanaman Hortikultura Semusim, Hortikultura Tahunan, dan Lainnya
	3	Perkebunan Semusim dan Tahunan
	4	Peternakan
	5	Jasa Pertanian dan Perburuan
	6	Kehutanan dan Penebangan Kayu
	7	Perikanan
B. Pertambangan dan Penggalian	8	Pertambangan Minyak, Gas dan Panas Bumi
	9	Pertambangan Batubara dan Lignit
	10	Pertambangan Bijih Logam
	11	Pertambangan dan Penggalian Lainnya
C. Industri Pengolahan	12	Industri Batubara dan Pengilangan Migas
	13	Industri Makanan dan Minuman
	14	Industri Pengolahan Tembakau
	15	Industri Tekstil dan Pakaian Jadi
	16	Industri Kulit, Barang dari Kulit dan Alas Kaki
	17	Industri Kayu, Barang dari Kayu dan Gabus dan Barang Anyaman dari Bambu, Rotan dan Sejenisnya
	18	Industri Kertas dan Barang dari Kertas, Percetakan dan Reproduksi Media Rekaman
	19	Industri Kimia, Farmasi dan Obat Tradisional
	20	Industri Karet, Barang dari Karet dan Plastik
	21	Industri Barang Galian bukan Logam
	22	Industri Logam Dasar
	23	Industri Barang dari Logam, Komputer, Barang Elektronik, Optik dan Peralatan Listrik
	24	Industri Mesin dan Perlengkapan YTDL
	25	Industri Alat Angkutan
	26	Industri Furnitur
	27	Industri Pengolahan Lainnya, Jasa Reparasi dan Pemasangan Mesin dan Peralatan

Industri		Rincian
D. Pengadaan Listrik dan Gas	28	Ketenagalistrikan
	29	Pengadaan Gas dan Produksi Es
E. Pengadaan Air, Pengelolaan Sampah, Limbah, dan Daur Ulang	30	Pengadaan Air, Pengelolaan Sampah, Limbah, dan Daur Ulang
F. Konstruksi	31	Konstruksi
G. Perdagangan Besar dan Eceran; Reparasi Mobil dan Sepeda Motor	32	Perdagangan Mobil, Sepeda Motor dan Reparasinya
	33	Perdagangan Besar dan Eceran, Bukan Mobil dan Sepeda Motor
H. Transportasi dan Pergudangan	34	Angkutan Rel
	35	Angkutan Darat
	36	Angkutan Laut
	37	Angkutan Sungai Danau dan Penyeberangan
	38	Angkutan Udara
	39	Pergudangan dan Jasa Penunjang Angkutan, Pos dan Kurir
I. Penyediaan Akomodasi dan Makan Minum	40	Penyediaan Akomodasi
	41	Penyediaan Makan Minum
J. Informasi dan Komunikasi	42	Jasa Informasi dan Komunikasi Swasta
K. Jasa Keuangan dan Asuransi	43	Jasa Perantara Keuangan Selain Bank Sentral
	44	Asuransi dan Dana Pensiun
	45	Jasa Keuangan Lainnya
	46	Jasa Penunjang Keuangan
L. Real Estat	47	Real Estat
MN. Jasa Perusahaan	48	Jasa Perusahaan
O. Administrasi Pemerintahan, Pertahanan, dan Jaminan Sosial Wajib	49	Administrasi Pemerintahan, Pertahanan dan Jaminan Sosial Wajib
P. Jasa Pendidikan	50	Jasa Pendidikan
Q. Jasa Kesehatan dan Kegiatan Sosial	51	Jasa Kesehatan dan Kegiatan Sosial
RSTU. Jasa Lainnya	52	Jasa Lainnya

COMPILATION PROCESS: PROVINCIAL IOTS AND IRIO INDONESIA 2016

start

Compilation of National SUT* 2016

Supply Table

Use Table

Indonesia I-O Table

https://www.bps.go.id/subject/105/input-output.html#subjekViewTab3

*) SUT : Supply and Use Table

Work Program 2019

Work Program 2020

Work Program 2021

Multi Regional SUT (MR-SUT) 2016 as basis for Multi Regional IO (IRIO) Compilation

Multi Regional SUT (MR-SUT)

Supply Aceh . . . . . Supply Papua

Supply Multi Regional

Use Aceh . . . . . Use Papua

Use Multi Regional

Transform Multi Regional SUT (MR-SUT) into Interregional IO (IRIO)

IRIO Indonesia

END

https://www.bps.go.id/subject/105/input-output.html#subjekViewTab3

Compilation Regional SUTs 2016

start

SUT Regional

Supply Aceh : : Supply Papua

Use Aceh : : Use Papua

IO 34 Provinces

BADAN PUSAT STATISTIK PROVINSI BENGKULU

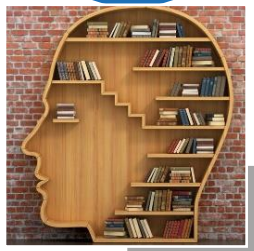
https://jakarta.bps.go.id/subject/105/input-output.html#subjekViewTab3

Interregional Matrix (Interregional Export and Import)

Interregional Export Matrix

Interregional Import Matrix

WORK PROGRAMS 2019-2021



2019

- Classification systems:
  - ➢52 industry
  - ➢65 products
- Build SUT dan IOT frameworks
- Preparing SUT data processing system
- Regional SUT and IOT training for BPS regional staff
- Special survey on IOs
- Data processing:
  - ➢Censuses/surveys data
  - ➢Administrative data
- Preliminary estimate for SUTs:
  - ➢National level
  - ➢34 provinces
- Preliminary estimate for valuation matrix:
  - ➢Trade and Transport Matrix (TTM)
  - ➢Imports destination matrix
- Transformation of prelim. Regional SUTs into prelim. Regional IOTs



2020

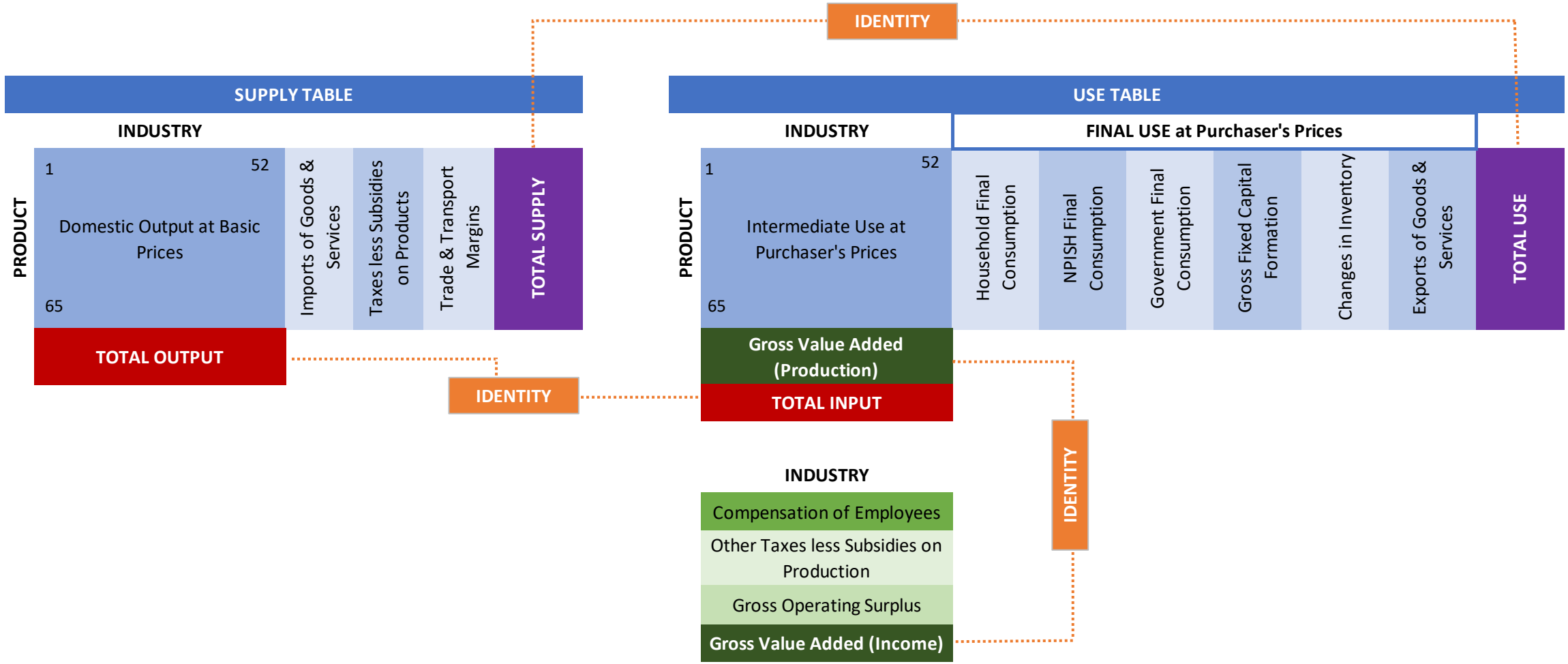
- National and regional stakeholders' consultations:
  - ➢Focus group discussions
  - ➢In-depth interviews
- Data processing for Special Survey on IOs : interregional transaction coefficients
- Build SUT Reconciliation System
- Reconciling SUTs:
  - national vs 34 provinces
  - ➢By columns/industry
  - ➢By rows/products
- Draft estimate for SUTs:
  - ➢National level
  - ➢34 provinces
- Preliminary estimate for valuation matrix:
  - ➢Trade and Transport Matrix (TTM)
  - ➢Imports destination matrix
- Transformation of draft Regional SUTs into draft Regional IOTs



2021

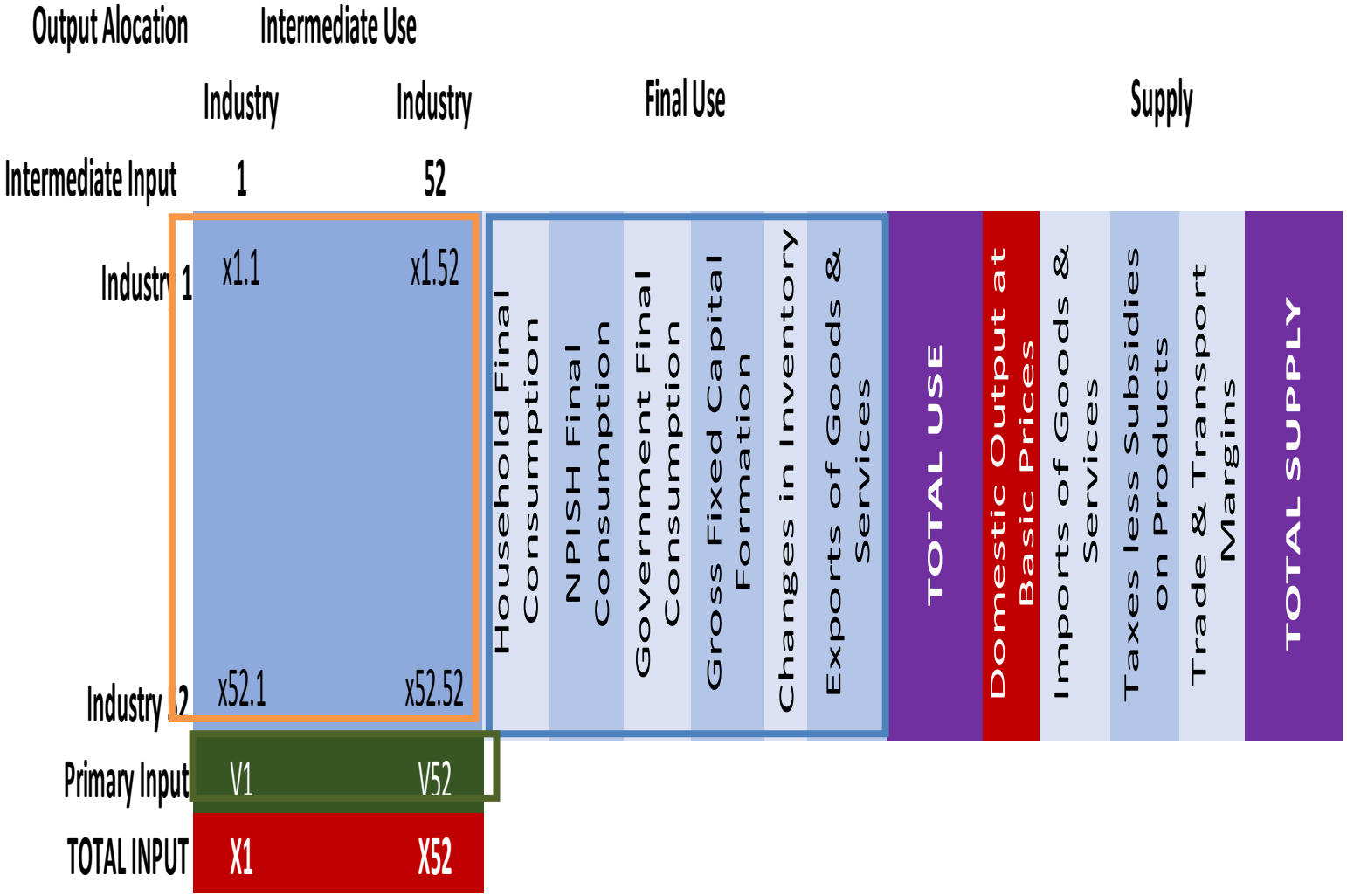
- Build interregional matrix reconciliation system
- Build Multi-Regional SUT (MR-SUT) and IRIO frameworks
- National and regional stakeholders' consultations:
  - ➢Focus group discussions
  - ➢In-depth interviews
- Calculate interregional transaction matrix:
  - ➢Interregional imports matrix
  - ➢Interregional exports matrix
- Reconciling 34 interregional imports and exports matrix
- Reconciling MR-SUT with National SUT
- Transforming MR-SUT into IRIO
- 30 April - Launching of IRIO Indonesia Data
- End of August – Early Oct : Socialization of IOTs/IRIO for regional stakeholders
- 21 Dec – IRIO Indonesia 2016 publication

SUPPLY AND USE TABLES (SUT) FRAMEWORK



GDP (Production) = GVA (Production) + Taxes less Subsidies on Products = **GDP (Income) = GVA (Income) + Taxes less Subsidies on Products** = **GDP (Expenditure) = Total Final Use - Imports of Goods and Services**

FRAMEWORK IOT (SINGLE REGION)



1 KUADRAN I

- ✓ Flows of goods and services produced by an industry are consumed as intermediate inputs by another industry.
- ✓ Describe consumption of goods and services for production process.
- ✓ It is called intermediate transaction or intermediate demand.

2 KUADRAN II

Describe the consumption of goods and services for final demand.

3 KUADRAN III

Describe primary inputs consumed by industry.

- **Kuadran I, II and III of input-output table describe transactions between economic agents.**
- **The three kuadrans are called transaction tables.**

FRAMEWORK IRIO
(Dimension: 2074 columns × 1870 rows)

Province and Industry			Intermediate Demand			Final Demand			Export/Rest of the World (RoW)	Total Output
			1. Provinsi Aceh	.....	34. Provinsi Papua	1. Provinsi Aceh	.....	34. Provinsi Papua		
			Industry		Industry	Component		Component		
			1 52		1 52	1....9		1....9		
Intermediate Input	1. Provinsi Aceh	Industry 1	X_{ii}^{AA}	.....	X_{ij}^{AB}	F_i^{AA}	.....	F_i^{AB}	E_i^A	X_j^A
		:								
		Industry 52								
	:	:	:	:	:	:	:	:	:	:
	34. Provinsi Papua	Industry 1	X_{ij}^{BA}	.....	X_{jj}^{BB}	F_i^{BA}	.....	F_i^{BB}	E_i^B	X_j^B
		:								
		Industry 52								
Import/Rest of the World (RoW)			X_j^{MA}	....	X_j^{MB}	F^{MA}	....	F^{MB}		
Total Primary Input			V_j^A	....	V_j^B					
Total Input			X_j^A	....	X_j^B					



DKI JAKARTA IN IRIO INDONESIA 2016

Output / Input	Intermediate Demand						Final Demand							Total Output
	Aceh	...	DKI Jakarta	⋮	Pabar	Papua	Aceh	⋮	DKI Jakarta	⋮	Pabar	Papua	Export RoW	
Aceh	A^{01-01}	...	A^{01-11}	...	A^{01-33}	A^{01-34}	F^{01-01}	...	F^{01-11}	...	F^{01-33}	F^{01-34}	ELN^{01}	O^{01}
...	A^{02-01}	...	A^{02-11}	...	A^{02-33}	A^{02-34}	F^{02-01}	...	F^{02-11}	...	F^{02-33}	F^{02-34}	ELN^{02}	O^{02}
DKI Jakarta	A^{03-01}	...	A^{03-11}	...	A^{03-33}	A^{03-34}	F^{03-01}	...	F^{03-11}	...	F^{03-33}	F^{03-34}	ELN^{03}	O^{03}
⋮	⋮	...	⋮	...	⋮	⋮	⋮	...	⋮	...	⋮	⋮	⋮	⋮
Pabar	A^{33-01}	...	A^{33-11}	...	A^{33-33}	A^{33-34}	F^{33-01}	...	F^{33-11}	...	F^{33-33}	F^{33-34}	ELN^{33}	O^{33}
Papua	A^{34-01}	...	A^{34-11}	...	A^{34-33}	A^{34-34}	F^{34-01}	...	F^{34-11}	...	F^{34-34}	F^{34-34}	ELN^{34}	O^{34}
Import RoW	ILN^{01}	...	ILN^{11}	...	ILN^{33}	ILN^{34}	ILN^{F-01}	...	ILN^{F-11}	...	ILN^{F-33}	ILN^{F-34}		
GVA	V^{01}	...	V^{11}	...	V^{33}	V^{34}								
Total Input	I^{01}	...	I^{11}	...	I^{33}	I^{34}								

- ✓ IRIO Indonesia 2016 is an integration of IOTs 34 provinces.
- ✓ The dimension of a single provincial IOT consist of 52x52 industry
- ✓ *Interregional-interindustrial dimension for IRIO Indonesia consist of 1.768 x 1.768 cells*
- ✓ *Total Dimension of IRIO Indonesia : 2.074 columns and 1.870 rows*

02

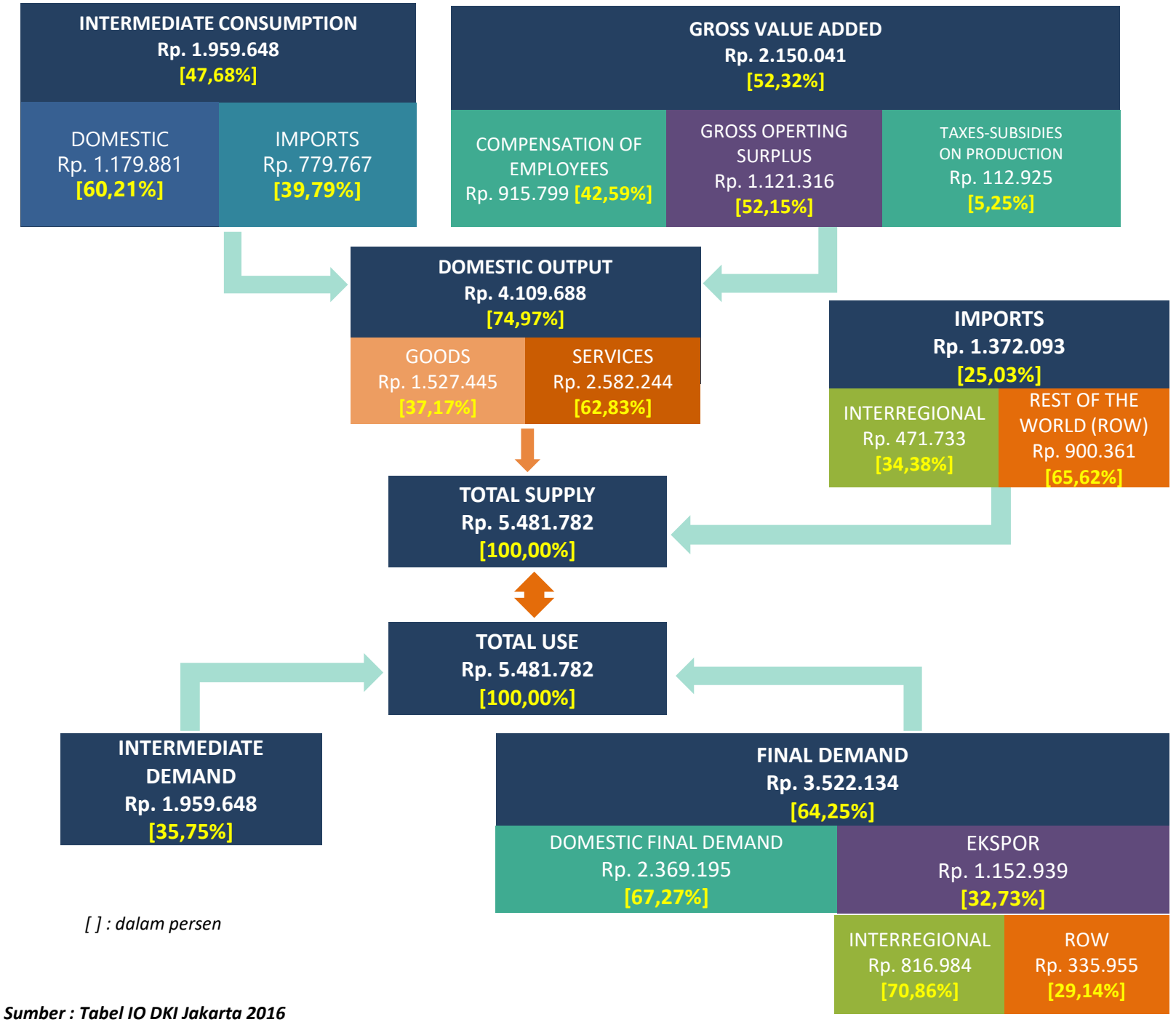
KEY FINDINGS



Photo by Nusalab Studios on Unsplash

SUPPLY & DEMAND IN EACH PROVINCES

DKI JAKARTA 2016 (Trilion Rp)



[ ] : dalam persen

A. GDP Production	
1. GVA	2.150.041
TOTAL	**2.150.041**

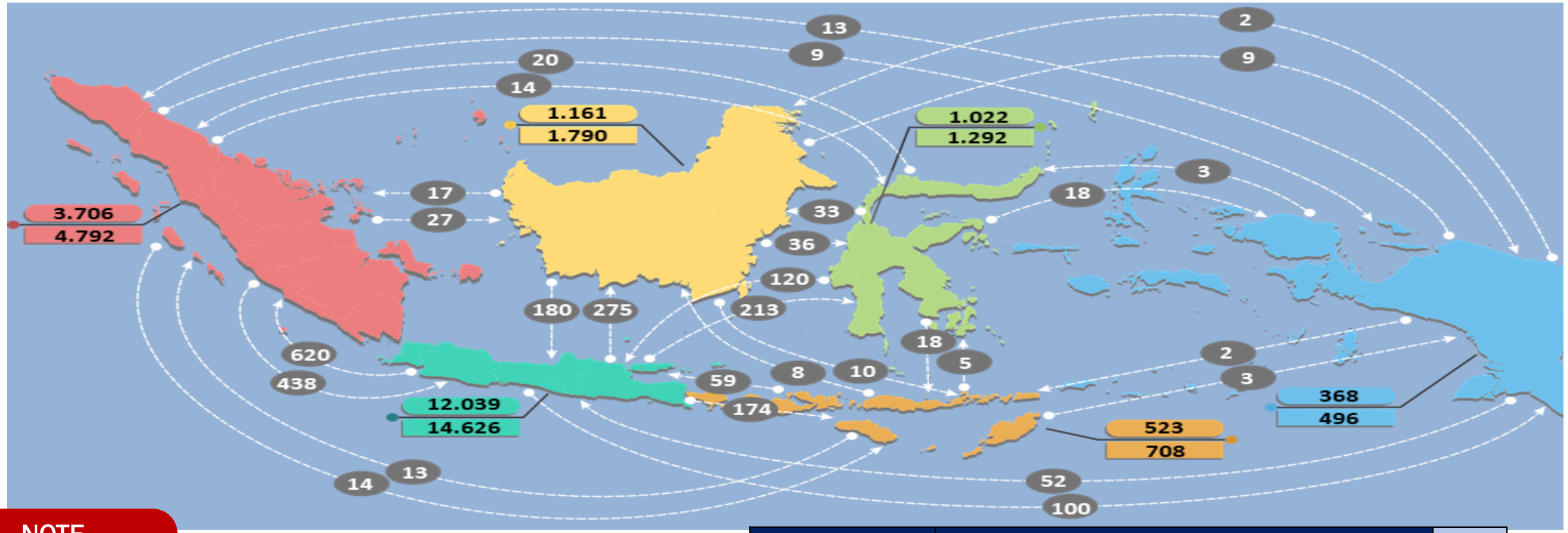
B. GDP EXPENDITURE	
1. Domestic Final Demand	2.369.195
2. Exports	1.152.939
3. Less Import	1.372.093
TOTAL	**2.150.041**

C. GDP INCOME	
1. Compensation of Employees	915.799
2. Gross Operating Surplus	1.121.316
3. Taxes less Subsidies on Production	112.925
TOTAL	**2.150.041**

GDP OF DKI JAKARTA 2016

Sumber : Tabel IO DKI Jakarta 2016

INTER AND INTRA ISLANDS OUTPUT TRANSACTIONS



NOTE

Total Output

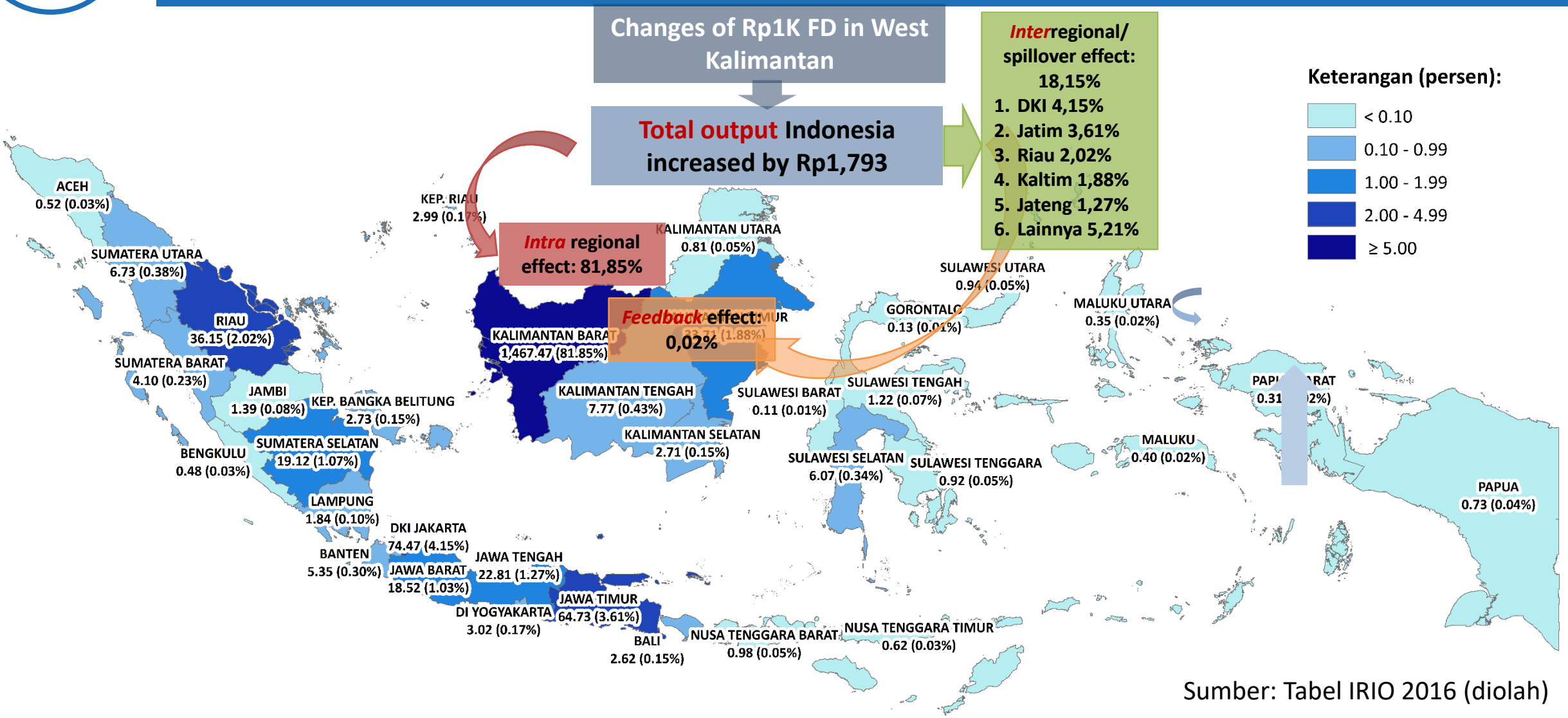
Intra-island output transaction

Inter-islands output transactions

		Destinasi Output							TOTAL
		Sumatera	Jawa	Bali & Nusa Tenggara	Kalimantan	Sulawesi	Maluku & Papua	Luar Negeri	
Asal Output	Sumatera	3.706,00	437,76	13,87	27,19	13,74	8,95	584,97	4.792,48
	Jawa	620,02	12.038,73	174,31	275,19	213,41	100,35	1.203,48	14.625,50
	Bali & Nusa Tenggara	12,68	59,14	523,18	8,05	5,46	3,46	95,99	707,96
	Kalimantan	16,98	179,72	10,38	1.161,04	36,49	8,80	377,00	1.790,40
	Sulawesi	20,17	120,50	18,12	32,69	1.021,89	17,64	61,15	1.292,15
	Maluku & Papua	12,92	52,04	1,57	2,60	3,33	367,73	56,12	496,30

Source : Tabel IRIO Indonesia 2016

INTERREGIONAL RELATIONSHIP : *How changes in demand in a province (West Kalimantan) affect other provinces*



Sumber: Tabel IRIO 2016 (diolah)

LESSON LEARNED



IRIO Indonesia 2016 compilation process required quality and comprehensive data, as well as management support, data system, communication skills and robust but adaptive planning.



The COVID-19 pandemic that started in Indonesia in early 2020 forced us to adapt with a situation that previously unfamiliar or atypical situation that has become standard, usual, or expected; for examples: work from home, online meetings, online surveys, etc.



Some issues remains; such as good and quality data on interregional trade, re-exports treatments among regions, merchanting, etc.; but we believe in the future there are opportunity to improve these.

SOME DOCUMENTATIONS



LAUNCHING DATA IRIO INDONESIA 2016
30 April 2021



IOTs/IRIO SOCIALIZATION WEBINARS
End of August – Early October 2021

SOME DOCUMENTATIONS

Interregional Input-Output Tables of Indonesia 2016



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Abstraction

IRIO INDONESIA 2016 PUBLICATION
https://bit.ly/3Jp0k63



IRIO INDONESIA 2016 DATA
https://bit.ly/3tovcOv





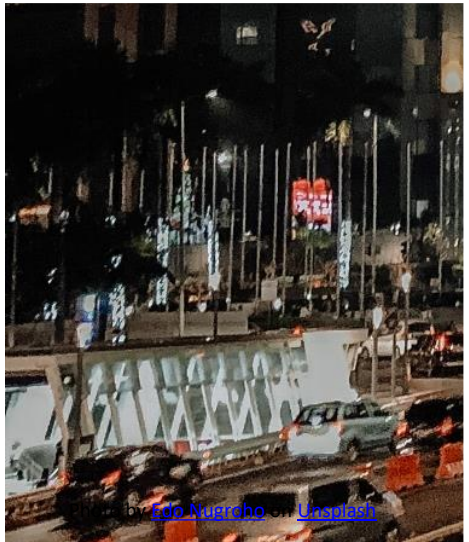




Photo by Edo Nugroho on Unsplash

BADAN PUSAT STATISTIK

Interregional Input-Output

Terima Kasih

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