

An aerial photograph of a river with several meanders flowing through a vast, green, grassy landscape. The river is a dark blue line against the lighter green terrain.

I-WAVES Training on Macroeconomic Indicators

Session 1a: Introduction to
National Accounts and the System
of Environmental-Economic
Accounting



Wealth Accounting and the Valuation of Ecosystem Services
www.wavespartnership.org



Overview & Objectives

This training week is on Adjusted Macroeconomic Indicators and their application in Indonesia. We will cover the following topics:

- Conceptual background on macroeconomic indicators derived from the national income accounts
- Conceptual background and macroeconomic indicators derived from the natural capital accounts
- Estimation methodologies and data sources for construction of key macroeconomic indicators
- Training and exercises using actual data for Indonesia
- Policy uses and applications



Overview & Objectives

At the end of the training week, we should have achieved the following objectives:

- An understanding of the principles and methodology for the calculation of conventional macroeconomic indicators derived from the national income accounts and adjusted macroeconomic indicators derived from the natural capital accounts
- An appreciation of the various relevant data sources
- Ability to utilise data and carry out necessary calculations of indicators
- An understanding of how the resulting indicators can be used for policy purposes

Outline of the week

The topics we will cover over the week include:

- 1a. Introduction:
 - Conventional macroeconomic accounts and indicators
 - Adjusted macroeconomic indicators
- 1b. World Bank work and data sources on wealth accounting and adjusted macroeconomic indicators
- 2. Applying adjusted macroeconomic indicators – national income and savings in Indonesia
- 3. Wealth accounts in Indonesia
- 4. Practical applications, policy uses and the way forward



INTRODUCTION TO NATIONAL (MACROECONOMIC) ACCOUNTS



National Accounts

National accounts measure macroeconomic flows in the economy, notably national income

Total value generated by economic activity – the production and use of goods and services - in a particular economy (usually a country)

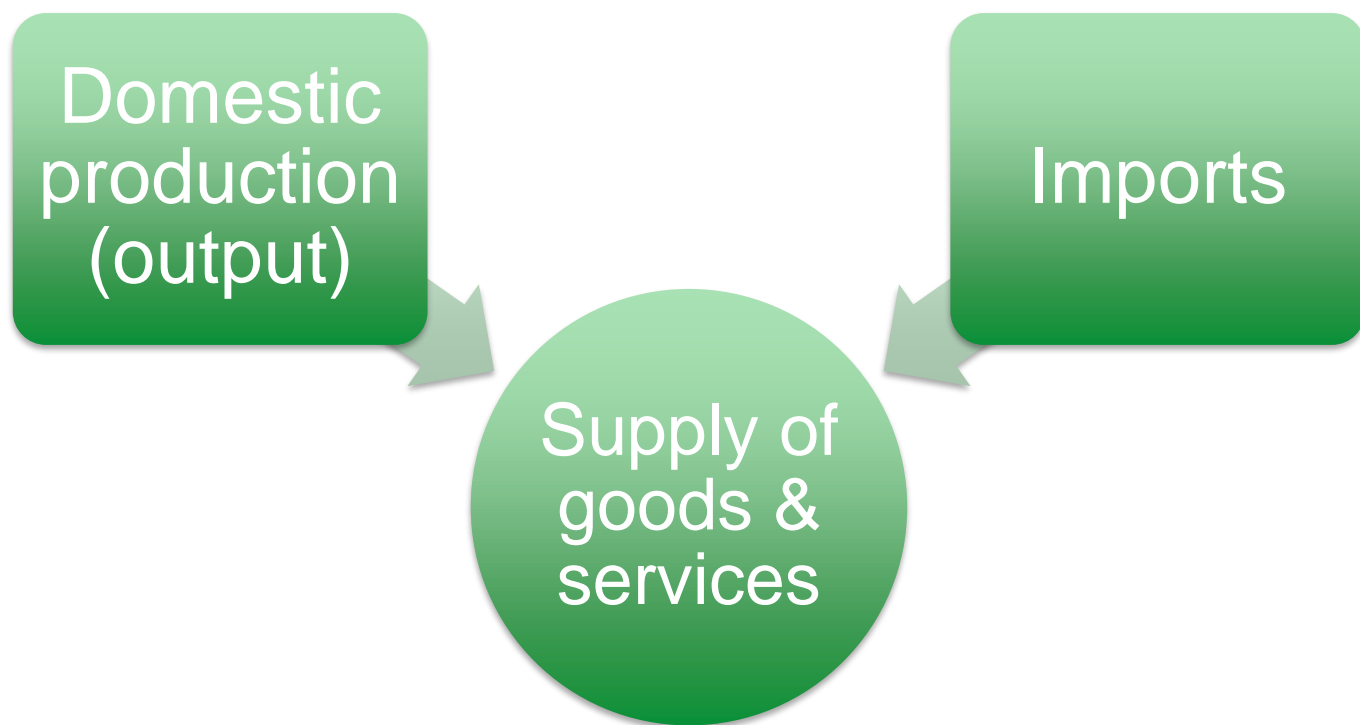
Can be measured in different ways, but the most commonly used is Gross Domestic Product (GDP)

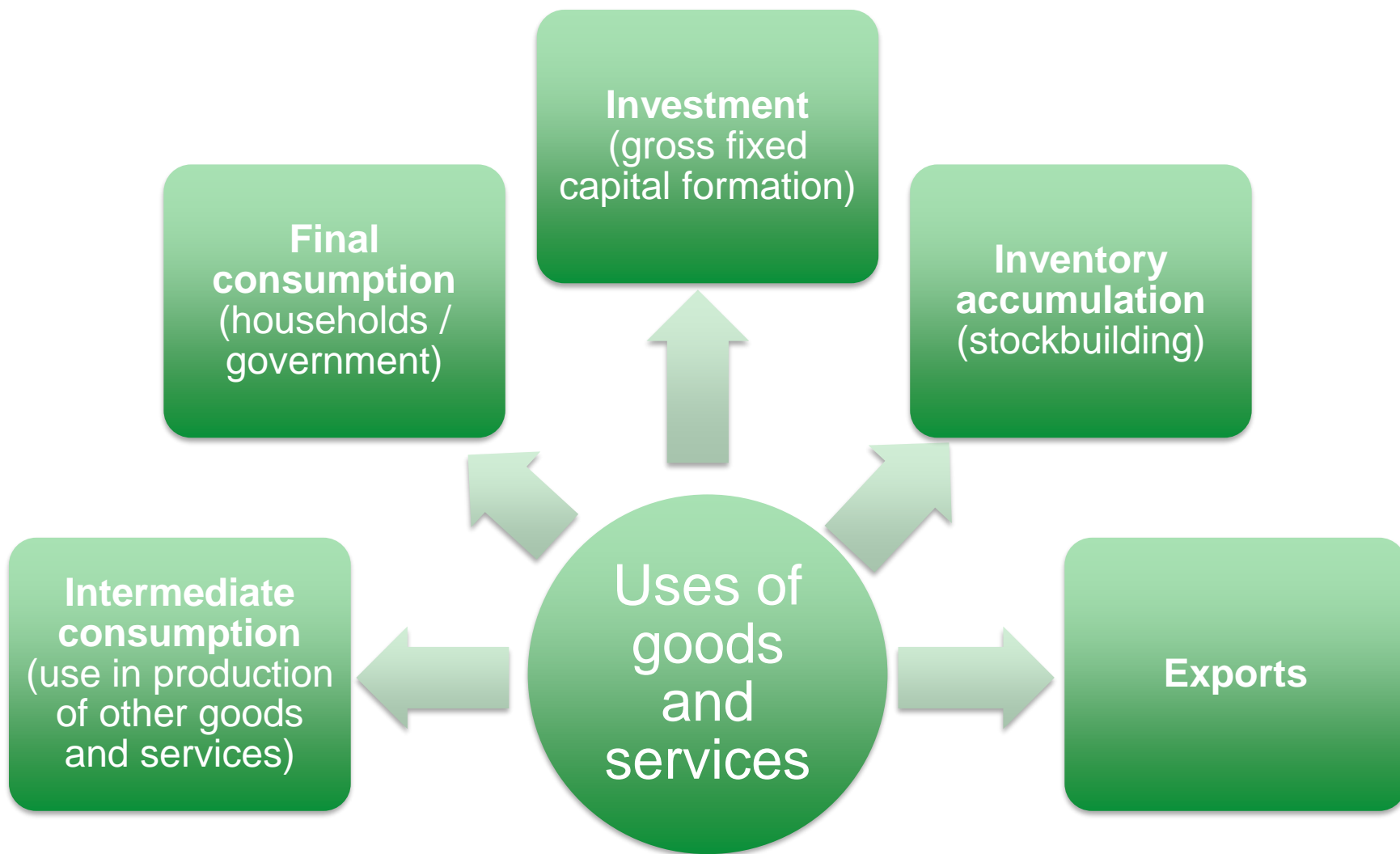
Based on the UN System of National Accounts (SNA)

Provides common methodology across countries

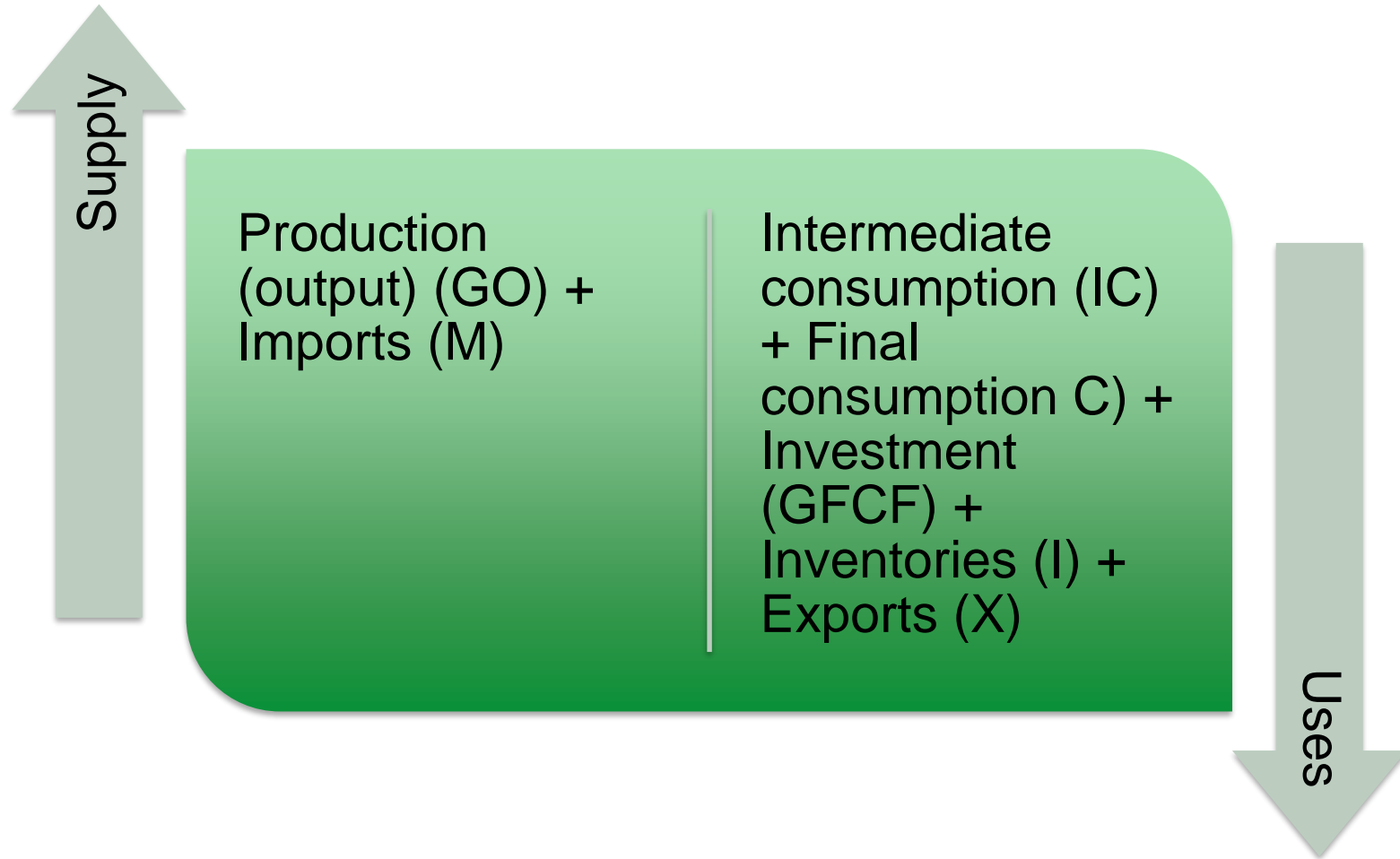
National Accounts

NA starting point: total supply of goods and services = total uses of goods and services.





Total Supply = Total Use



Basic National Accounting Identities: Output and Value Added

1. $GO + M = IC + C + I + X$

- Total supply = total use

2. $GO - IC = C + I + X - M$

3. $VA = GO - IC$

- Value added = output – intermediate consumption
- The value of all goods and services available for purposes other than intermediate consumption

Basic National Accounting Identities: Value Added and GDP

To ensure a uniform valuation of goods and services (from the supply and use perspective, taxes and subsidies must be taken account of:

4. $GDP = VA + \text{taxes} - \text{subsidies}$

- National income (Y) measured at market prices

5. $GDP = Y = C + I + X - M$

- Value added = consumption + investment + net exports = national income (Y)
- **GDP by expenditure**

Basic National Accounting Identities: GDP

The production process creates income for all those involved in providing inputs, including labour, owners of capital, and government

6. $Y = \text{compensation of employees} + \text{taxes} - \text{subsidies} + \text{gross operating surplus/mixed income}$

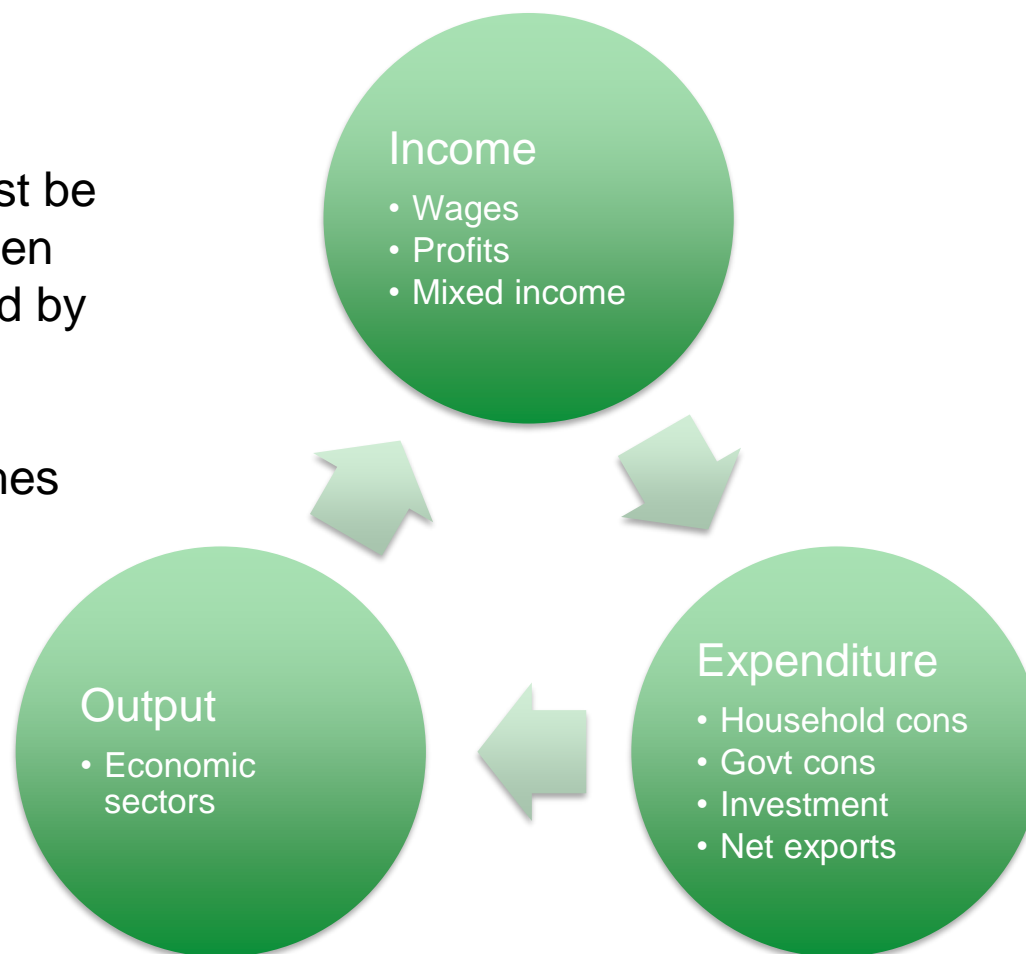
- **GDP by income**

Finally, GDP (value added) is comprised of the value of the output of the different sectors of the economy (mining, agriculture, manufacturing, services etc.)

- **GDP by output**

Circular flow of national income

GDP must be equal when measured by these different approaches



Basic National Accounting Identities: GDP and GNI

Basic national income identity

5. $GDP = Y = C + I + X - M$

GDP represents the income or output generated within a country

However, some of this income may be attributable to non-residents, or residents may have income arising from outside of the country

- E.g. work done (wages earned) abroad by residents, or property income earned from abroad, such as interest or dividends from investments in the RoW
- Similarly for wages or property income earned in the country by non-residents

Hence income attributable to residents – is found by adjusting GDP for flows of net primary income from abroad

7. $GNI = GDP \text{ plus inflows of primary income (compensation of employees and property income) from abroad minus outflows of primary income}$

Gross National Income

Basic National Accounting Identities: Savings and External Balance

Savings, investment external balance

8. $Y = C + S$

- Income = consumption + savings

9. $S = I + X - M$

10. $S - I = X - M$

- Savings – investment = net exports of goods & services

From the balance of payments:

- Current account balance ($X - M$) = - capital/financial account balance
- Current account surplus = capital outflow = acquiring claims (assets) against RoW
- Savings (S) is used either to accumulate domestic assets (I) or foreign assets ($X - M$)
- If $S < I$, the difference must be financed by borrowing/investment from RoW

Calculation of Gross National Savings

Gross Domestic Product

- Plus: net primary income from abroad

Gross National Income

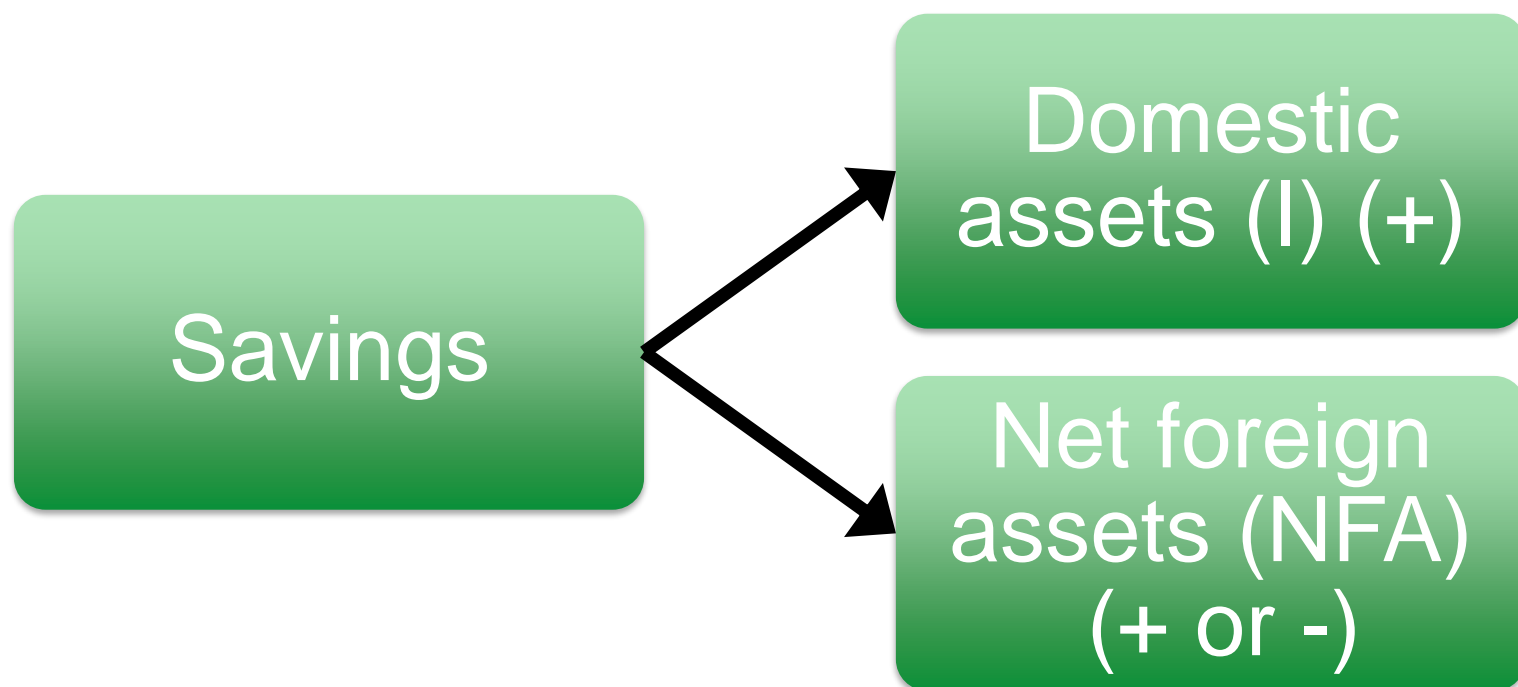
- Plus: net current transfers from abroad

= Gross National Disposable Income

- Deduct: household final consumption
- Deduct: government final consumption

= Gross National Savings

GDP, Savings and Asset Accumulation



A national balance sheet, comprising domestic and foreign assets, can be constructed; changes are driven by the level of savings. In practice, however, such national balance sheets hardly exist

Calculation of net borrowing / lending

Gross National Savings

- Plus: net capital transfers
- Less: gross fixed capital formation

= Net lending or borrowing from abroad

- Net acquisition of financial assets less net incurrence of liabilities

Current and constant price data

The source data that are used for GDP calculations are in current prices – i.e. are in money values at the time of reporting.

As GDP data change over time, they include the impact of underlying economic changes (e.g. increased production of goods and services) and changes in prices.

i.e. they include both a volume effect and a price effect

Typically, we need to distinguish the two – is an increase in measured GDP due to higher prices (inflation) or higher (real) output?

Current and constant price data

Changes in GDP are therefore disaggregated into price effects and volume (real) effects

$$\text{GDP current prices} = \text{GDP constant prices} * \text{GDP deflator}$$

The GDP deflator is a price index – similar to a consumer price index – covering the range of goods and services that make up GDP.

GDP at constant prices measures the volume of goods and services that make up GDP, after removing price effects.

The “deflation” of current price GDP is done at various different levels of the components of GDP

Current and constant price data

The GDP deflator is an outcome, and can be measured or derived as follows:

$$\text{GDP def}_t = 100 * \text{GDP (CP)}_t / \text{GDP (KP)}_t$$

As with all price index series, the GDP deflator has a base year, when current price and constant price GDP are equal (and the GDP deflator therefore has a value of 100)

Converting current price GDP to constant price GDP:

$$\text{GDP (KP)}_t = 100 * \text{GDP (CP)}_t / \text{GDP def}_t$$

GDP at constant prices is often known as real GDP

Current and constant price GDP data - example

GDP (CP) in 2015 = 150

GDP def in 2015 = 120 (with a base year of 2010 = 100)

GDP (KP) in 2015 = $100 * 150/120 = 125$ (at 2010 prices)



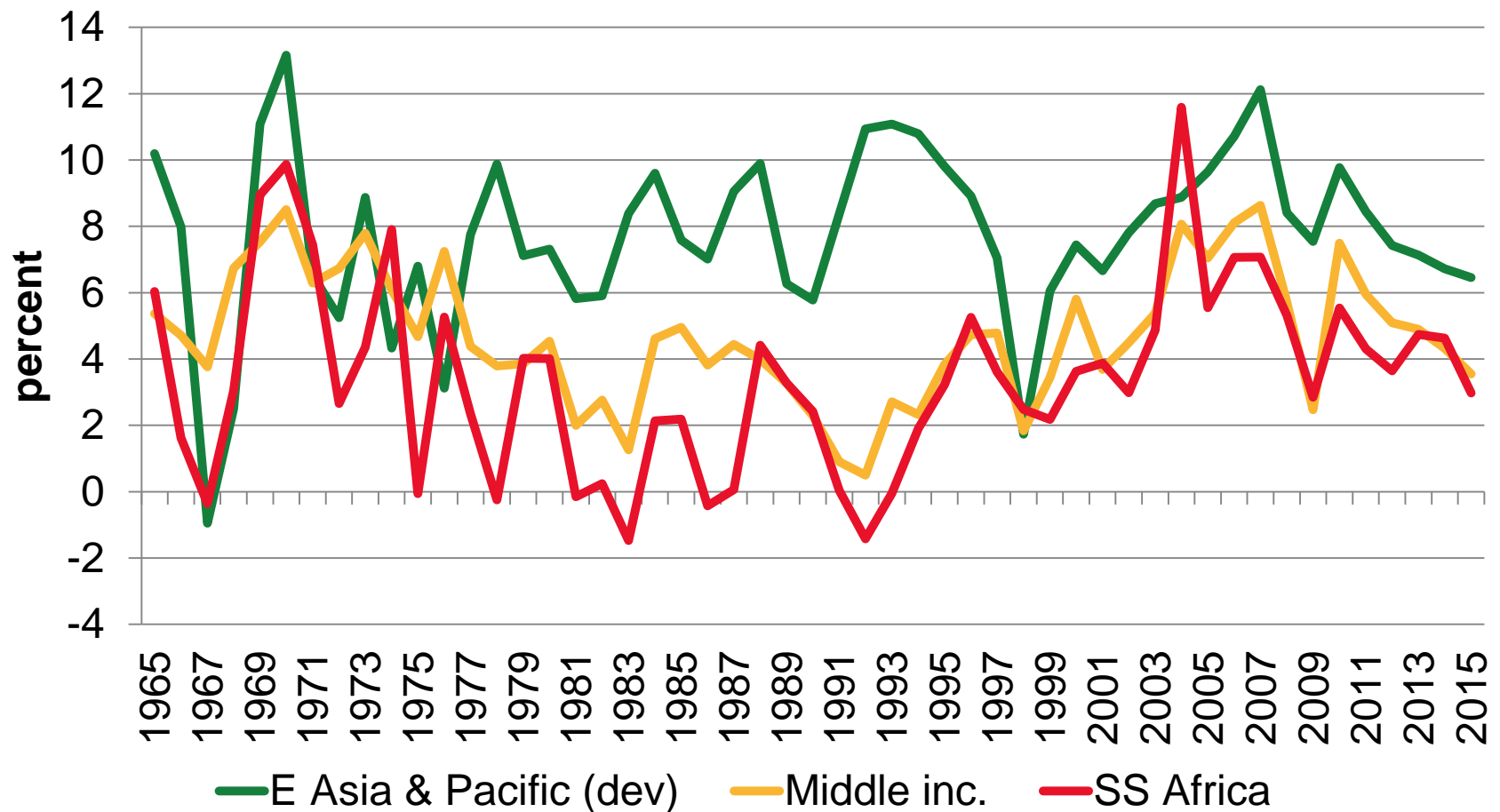
Key uses of national income accounts

GDP data and the various contributors are central to economic analysis and policymaking

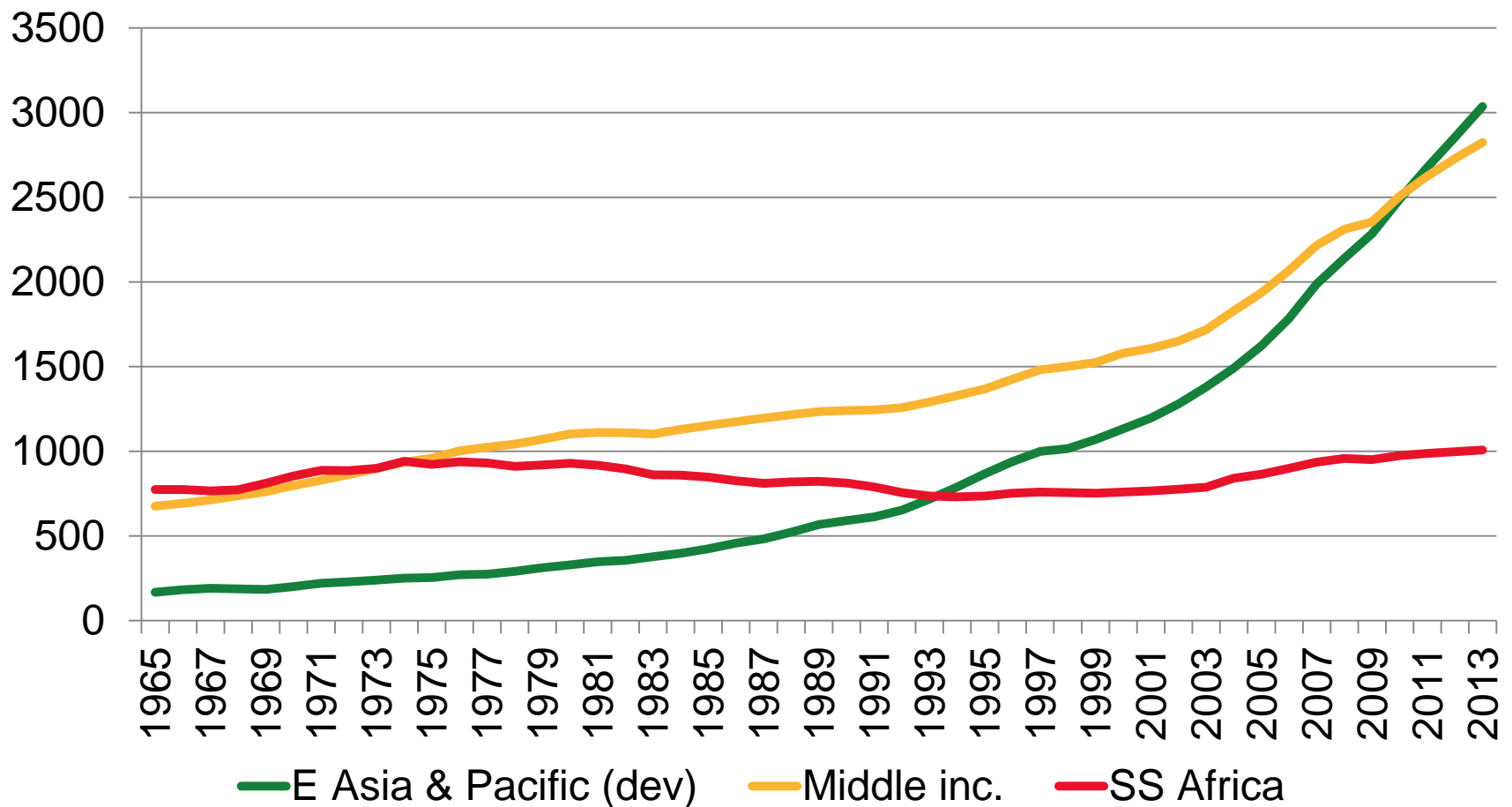
Key indicators include:

- Real GDP growth (change in GDP (KP) over a specific time period, usually one year)
- Real growth rates of economic sectors (from GDP by output), e.g. agriculture, manufacturing, services
- Composition of expenditure drivers of GDP (is GDP being driven by consumption, investment, net exports?)
- Gross investment rate (ratio of GFCF to GDP, from GDP by expenditure)
- Real GDP (or GNI) per capita (total real GDP / population)
- Real GDP (GNI) per capita growth

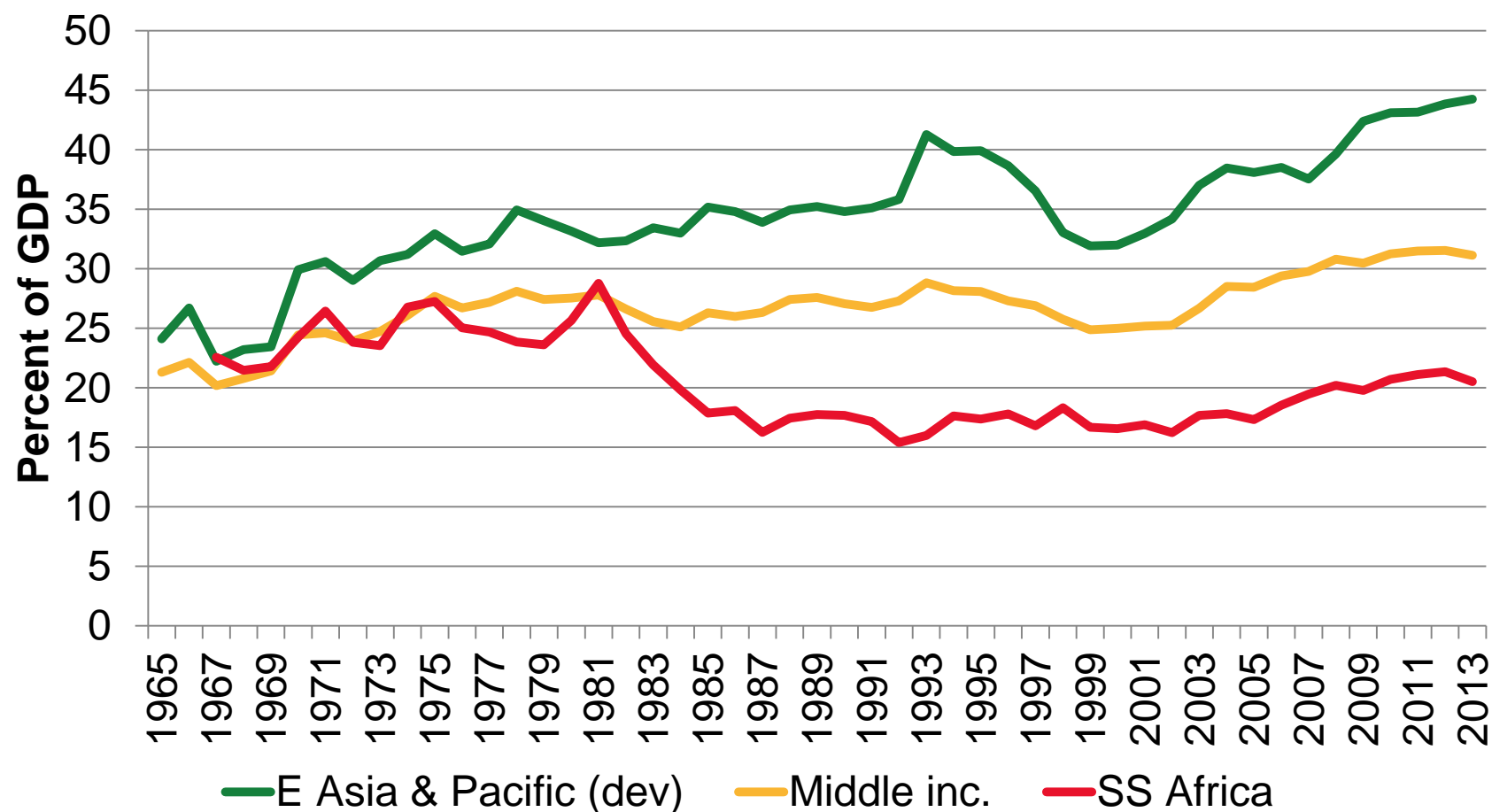
Real GDP growth rates



Real per capita GDP



Investment rates (GFCF / GDP)



MOVING BEYOND GDP



GDP and Wealth

Gross Domestic Product (GDP) – an important macroeconomic indicator for a country's health and economic performance. BUT

“GDP tells you nothing about sustainability. [...] No one would look just at a firm's revenues to assess how well it was doing. Far more relevant is the balance sheet, which shows assets and liability. That is also true for a country.”

Joseph Stiglitz, “Good Numbers Gone Bad”, October 2006

GDP growth is not necessarily correlated to wealth creation

- Rapid GDP growth could be driven by the depletion of non-renewable resources
- High GDP per capita could be based on “income” from the sale of non-renewable resources

National Accounts shortcomings

Recent thinking has focused on some of the shortcomings of conventional national accounts measures:

- Focuses on monetary transactions, at market prices

- May therefore omit some important non-monetary transactions, that are not priced in the market – such as externalities

Provides a measure of economic activity, but doesn't measure whether that activity is sustainable

In particular, it doesn't take into account:

- Environmental impacts of economic activity (e.g. pollution)

- Depletion of natural resources (e.g. minerals, forests)

- Accumulation / depletion of human assets

National Accounts shortcomings

The lack of a national balance sheet in conventional national accounts is a major shortfall:

are national assets being accumulated or depleted?

Because of these shortcomings, conventional national accounts may not provide a reliable source of information for policymakers/policy decisions



**“What we measure affects what we do;
and if our measurements are flawed,
decisions may be distorted.”**

Stiglitz, Sen and Fitoussi (2009)



SYSTEM OF ENVIRONMENTAL- ECONOMIC ACCOUNTING (SEEA) – NATURAL CAPITAL ACCOUNTING



System of Environmental-Economic Accounting (SEEA)

An attempt to broaden measures of macroeconomic accounting to take account of wider range of factors that impact on welfare

**Integrated accounting of the economy and the environment
Beyond the scope of the conventional SNA – but consistent with SNA methodology**

Incorporates other factors that have an impact on welfare:

Environmental impacts (e.g. pollution)

Consumption of natural resources (e.g. minerals, forests)

Accumulation (or depletion) of environmental and human assets

System of Environmental-Economic Accounting (SEEA)

Proposes a broader set of macroeconomic indicators than the conventional SNA

- Providing more information to policymakers

- Guide for decision-making

- Focused on long-term sustainability

Supplements SNA by considering natural capital (broadly defined) and human capital, as well as physical and financial capital

Accounts for both stocks and flows of environmental resources

Introduces measures of national assets (i.e. a balance sheet) to supplement income/flow accounts

SEEA – Adjusted Macroeconomic Indicators

SEEA involves the preparation of adjusted macroeconomic indicators in order to address key sustainability questions

To take into account consumption of assets, environmental damage, and production of human capital, as well as conventional macroeconomic measurements

Key Sustainability Issues: National Income Accounts

- How much real income is generated in the economy each year?
- How is the available national income distributed between consumption and savings?
- Addressed through the calculation of two new macroeconomic indicators:
 - Adjusted net national income (ANNI)
 - Adjusted net national savings (ANNS)

Key Sustainability Issues: National Wealth

What are the trends in the national balance sheet – in the the level and composition of assets?

Prepare estimates of main components of national balance sheet (comprehensive wealth)

Trends in real assets (total and per capita)

Trends in different components (produced capital, natural capital, intangible/human capital)

SEEA: ADJUSTED MACROECONOMIC INDICATORS – INCOME AND SAVINGS



Adjusted macroeconomic flow variables

Adjusted net national income (ANNI)

Adjusts the conventional GDP / GNI measure of income by deducting the amounts attributable to asset depletion

Adjusted national savings

Adjusts the conventional measure of (gross) national savings for asset depletion; environmental damage and investment in human capital

Adjusted Net National Income (ANNI)

Gross Domestic Product (GDP)

- *Add:* net receipts from compensation of employees from abroad
- *Add:* net property income from abroad

Gross National Income (GNI)

- *Deduct:* consumption of fixed capital (depreciation)

Net National Income (NNI)

- *Deduct:* consumption of natural capital (e.g. mineral resource depletion)

Adjusted Net National Income (ANNI)

Calculation of Genuine National Savings (Adjusted net savings)

Gross National Savings

- Deduct: consumption of fixed capital

= Net National Savings

- Add: expenditure on education (investment in human capital)
- Deduct: natural resource depletion (minerals, energy, forests etc.)
- Deduct: pollution damage

= Adjusted Net Savings (Genuine National Savings)

- Monitoring changes in wealth each year

SEEA: ADJUSTED MACROECONOMIC INDICATORS – NATIONAL BALANCE SHEET



National Balance Sheet – Tracking Assets

- **Conventional national accounts – tracks produced capital stock only (buildings, machinery, roads etc.)**
- **Wealth accounting – tracks a wider range of assets that are relevant from a sustainability perspective**

Natural capital

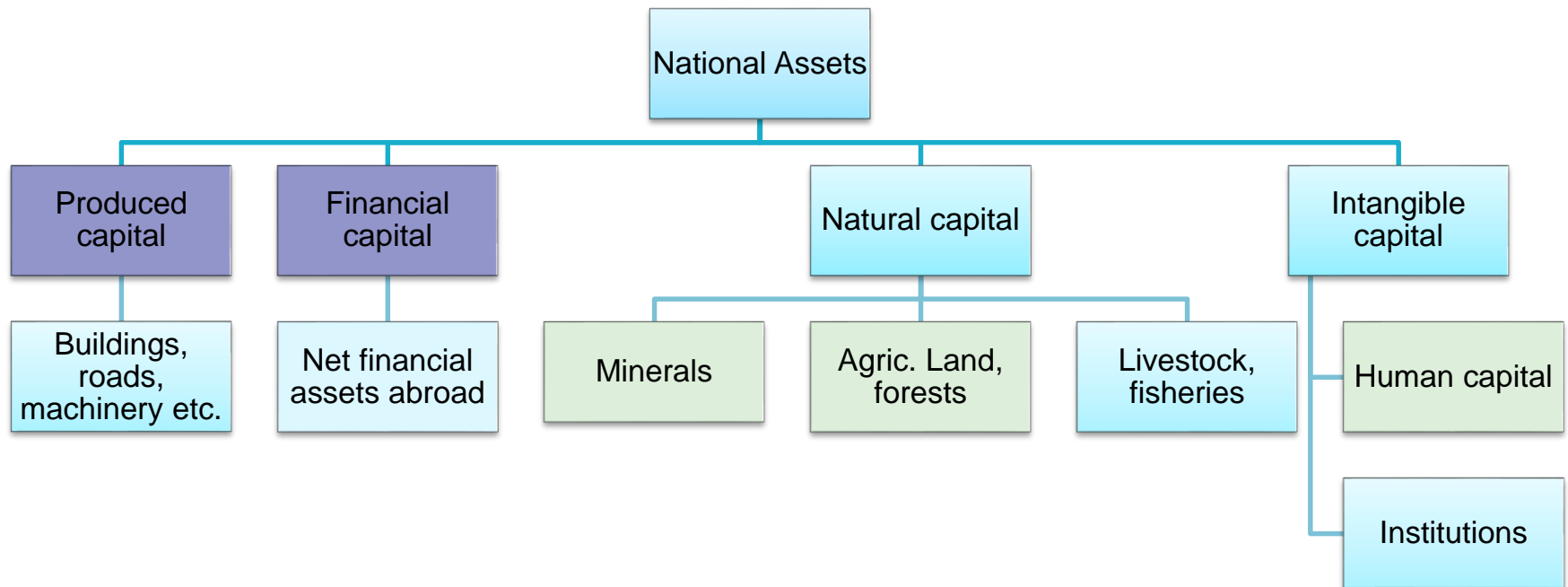
- **Minerals, fisheries, forests, livestock, land**

Financial assets (net foreign assets)

Intangible assets

- **Human capital, institutions**
- **Not always easy to track or measure**

National Balance Sheet



Conventional national accounts can yield information on produced capital and financial capital

Natural capital accounting extends this to include Natural Capital and Intangible Capital (although not all components may be included)

National Balance Sheet

Produced assets	
Plus:	Mineral assets
Plus:	Other natural capital (e.g. cropland, forests)
Plus:	Human capital
Plus:	Financial Assets
Equals:	Total Assets
Less:	Financial Liabilities
Equals:	Net Worth

Later, we will consider:

- Calculation of the values of the different components
- The composition of total net worth (division between types of assets)
- Trends in total and individual assets (in real terms and relative to GDP)
- Changes in total assets

QUESTIONS?

