

AU-UNIDO Side Event for TICAD V

Cleaner Technologies for Sustainable Industrial Development of Africa

Yokohama, Japan, 1 June 2013

Resource Productivity for Sustainable Industrialization in Africa

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Massive flow of materials on the globe

Consumer products



Resources

Wastes

as source of
resources

The earth is finite

as sink of
residuals

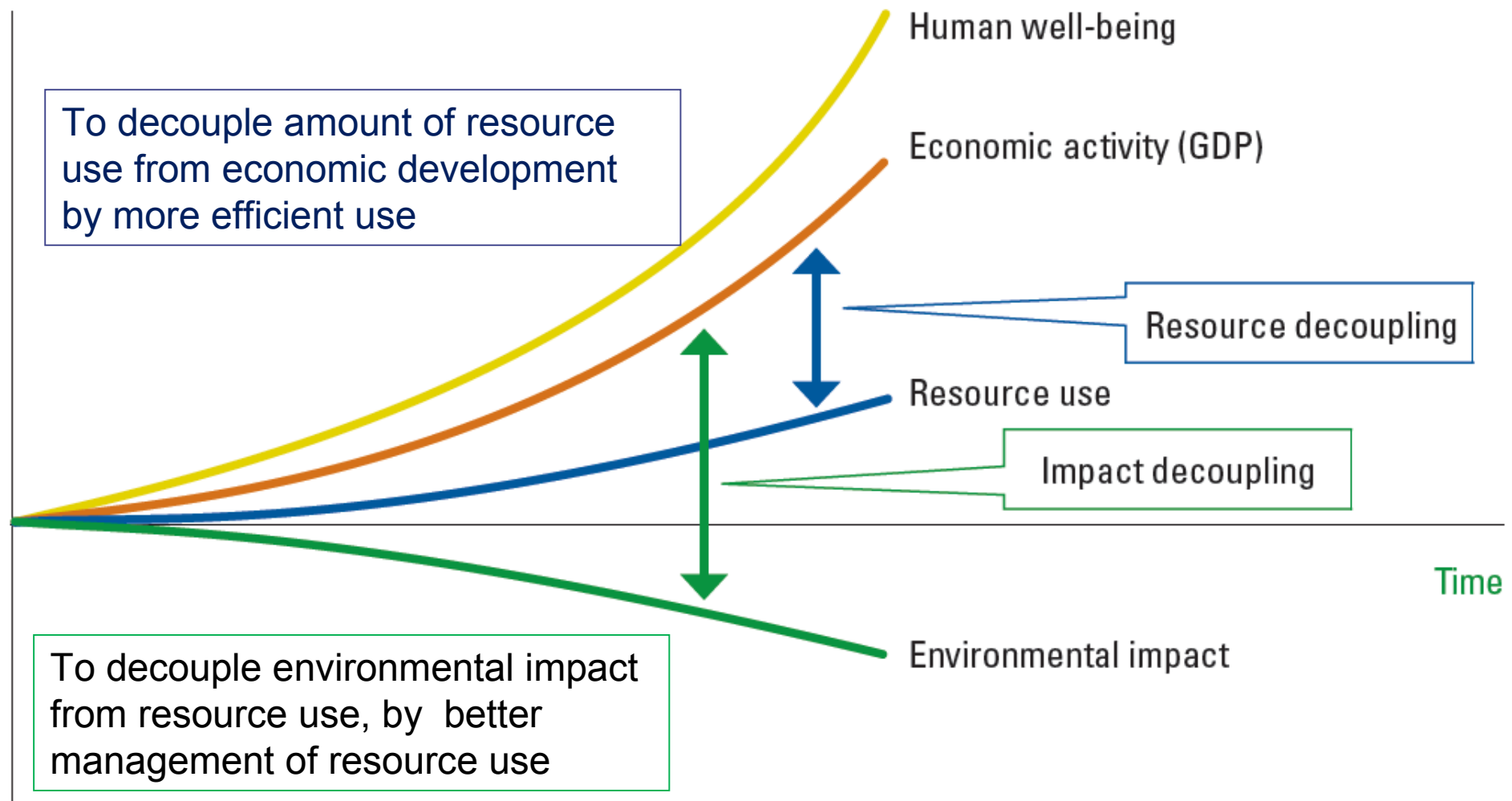
What is “Resource Productivity” ?

- Increase of resource productivity means **obtaining more output or better utility** for human well-being from products (i.e. goods and services) **while using less natural resources**, such as fossil fuels, metals and minerals, biomass, land, water, etc.
- The term “decoupling” is often used in the same context.
- I=PAT equation

$$\begin{array}{ccccccc} \text{I} & & \text{P} & & \text{A} & & \text{T} \\ \text{Impact} = \text{Population} & \times & \frac{\text{GDP}}{\text{Population}} & \times & \left(\frac{\text{Resource Use}}{\text{GDP}} + \frac{\text{Pollution/Waste}}{\text{GDP}} \right) \end{array}$$

Concept of “Decoupling”

Figure 2. Two aspects of ‘decoupling’



“Decoupling” report by UNEP International Resource Panel

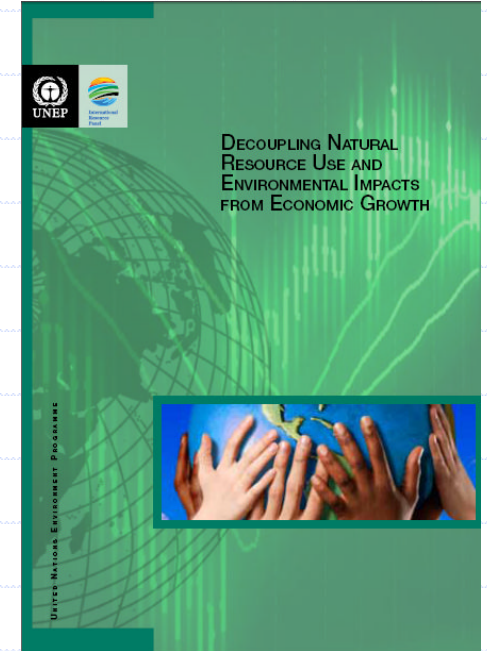
برنامج الأمم المتحدة للبيئة: يمكن
للإنسانية أن تحقق المزيد بمواردٍ أقل
بل ويتحتم عليها ذلك



**L’humanité peut et doit
faire plus avec moins,
souligne le PNUÉ**

**人类能够而且必须
少消耗多办事：环境规划署**

**Humanity Can and Must
Do More with Less: UNEP**



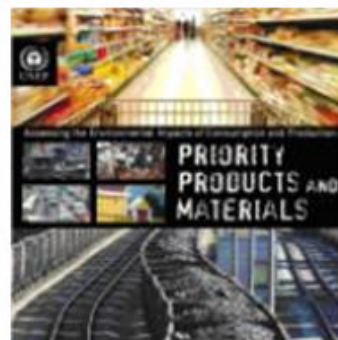
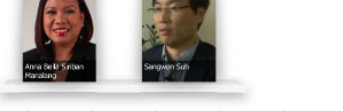
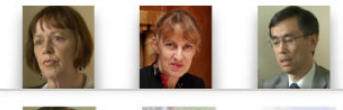
International Resource Panel



- ◆ Established on November 9th, 2007
- ◆ Secretariat : UNEP/DTIE
- ◆ Co-chair:
Ernst von Weizsäcker and Ashok Khosla
- ◆ The overall objective :
 - to provide independent scientific assessment of the environmental impacts due to the use of resources over the full life cycle,
 - and to advise governments and organizations on ways to reduce these impacts.

Members & Partners of the International Resource Panel

The International Resource Panel

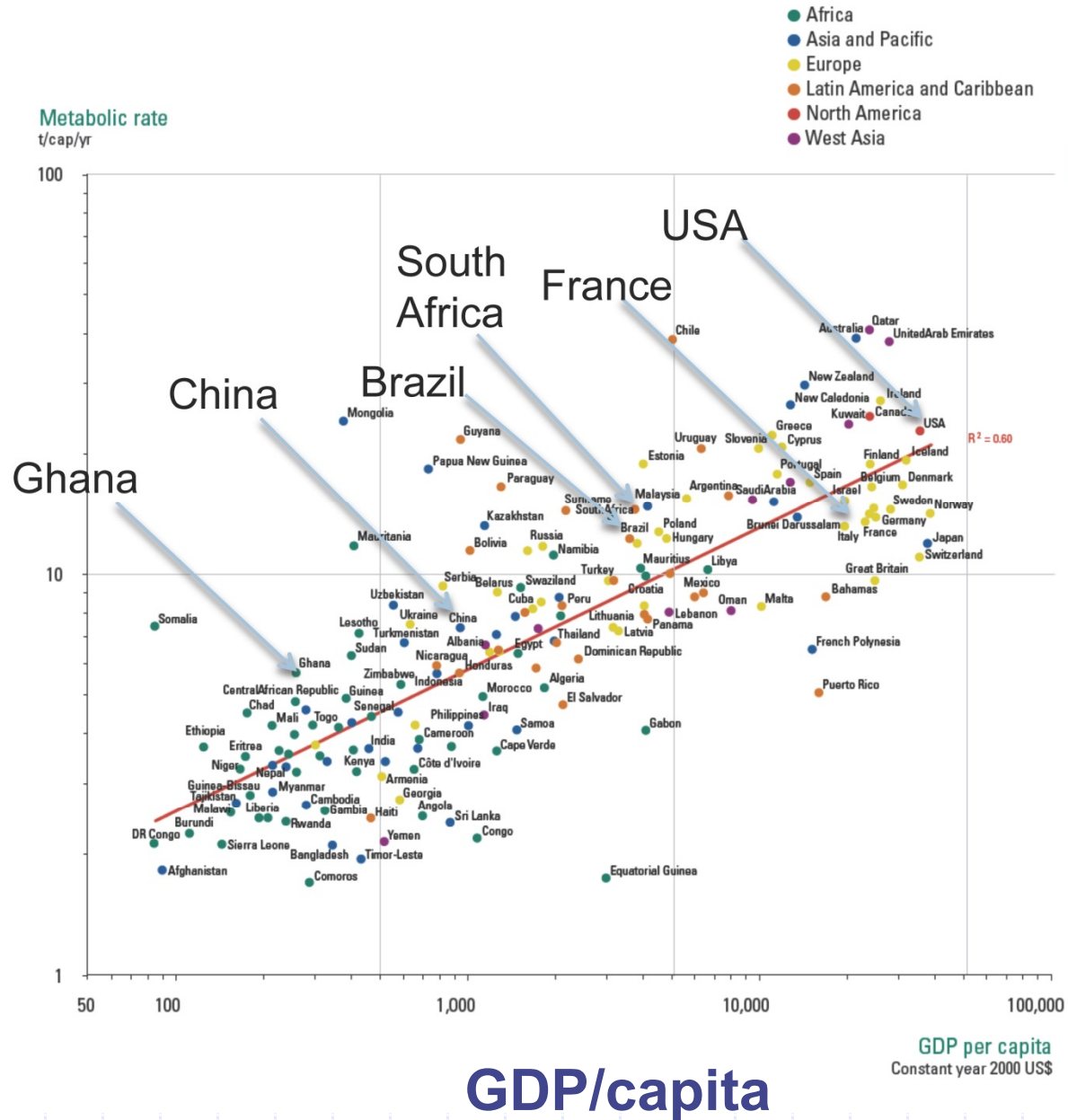


<http://www.unep.org/resourcepanel/>

The global interrelation between resource use and income

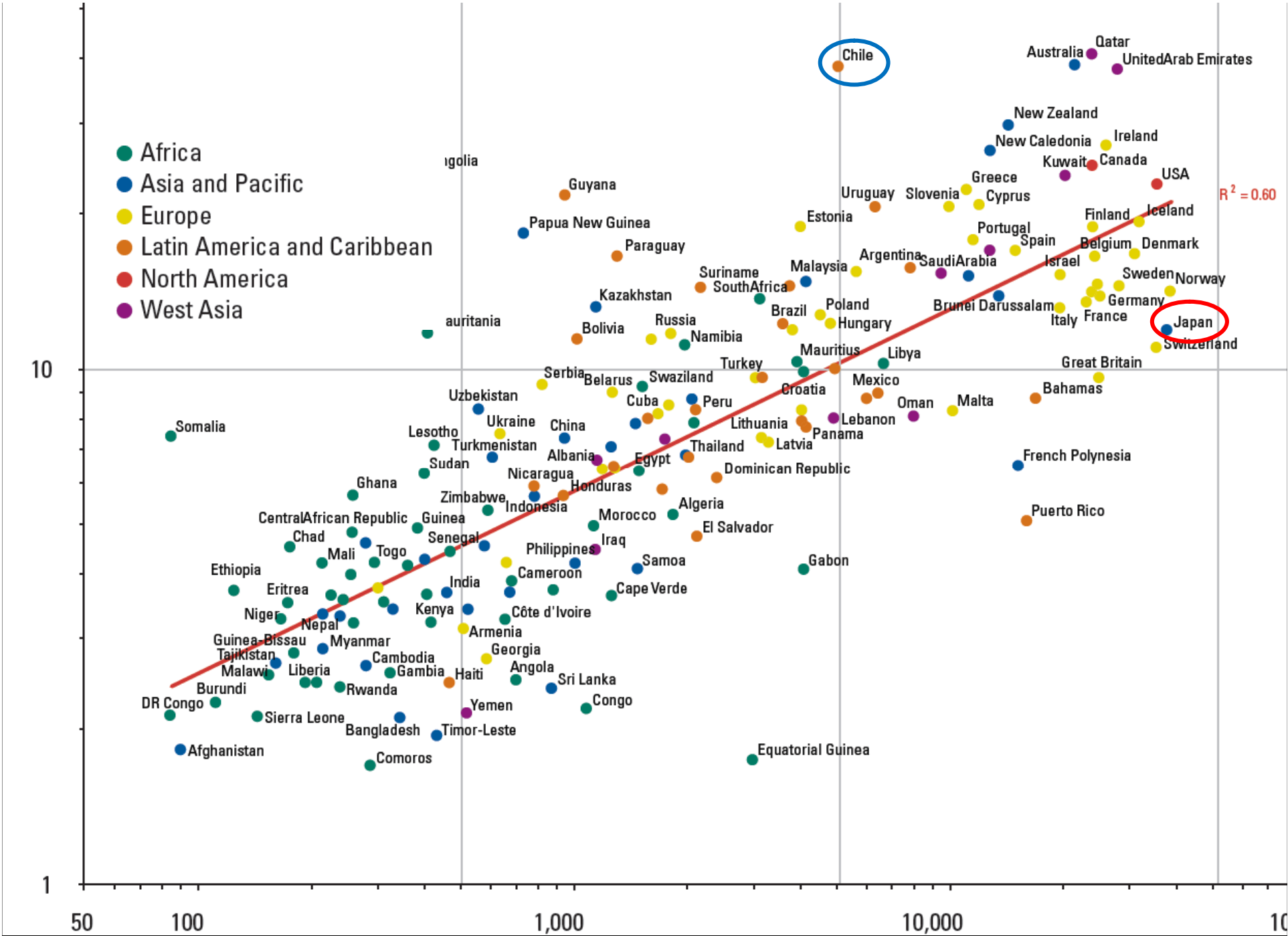
Resource use /capita

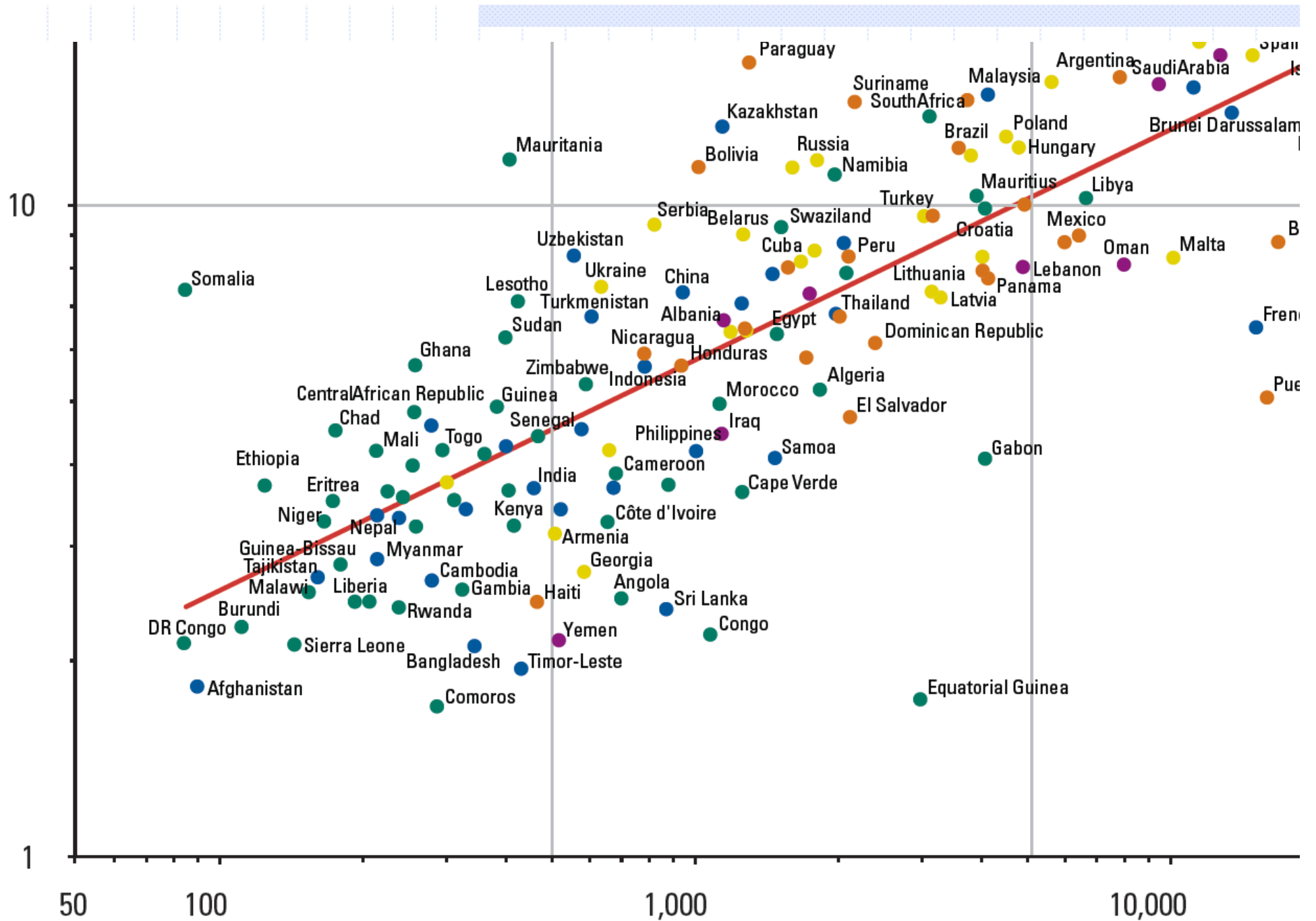
Interrelation between resource use & income



Source: UNEP/IRP

GDP/capita





Recent study on resource productivity in Africa by SERI for UNCTAD

SUSTAINABLE EUROPE
RESEARCH INSTITUTE



WORKING PAPER 13

Resource use and resource productivity in Africa⁺

Monika Dittrich^{1*}, Stefan Giljum², Barbara Lugschitz², Christine Polzin² und
Stephan Lutter²

+ This working paper is based on a background study for UNCTAD Report 2012, Economic Development in Africa; Structural Transformation and Sustainable Development in Africa. Geneva.

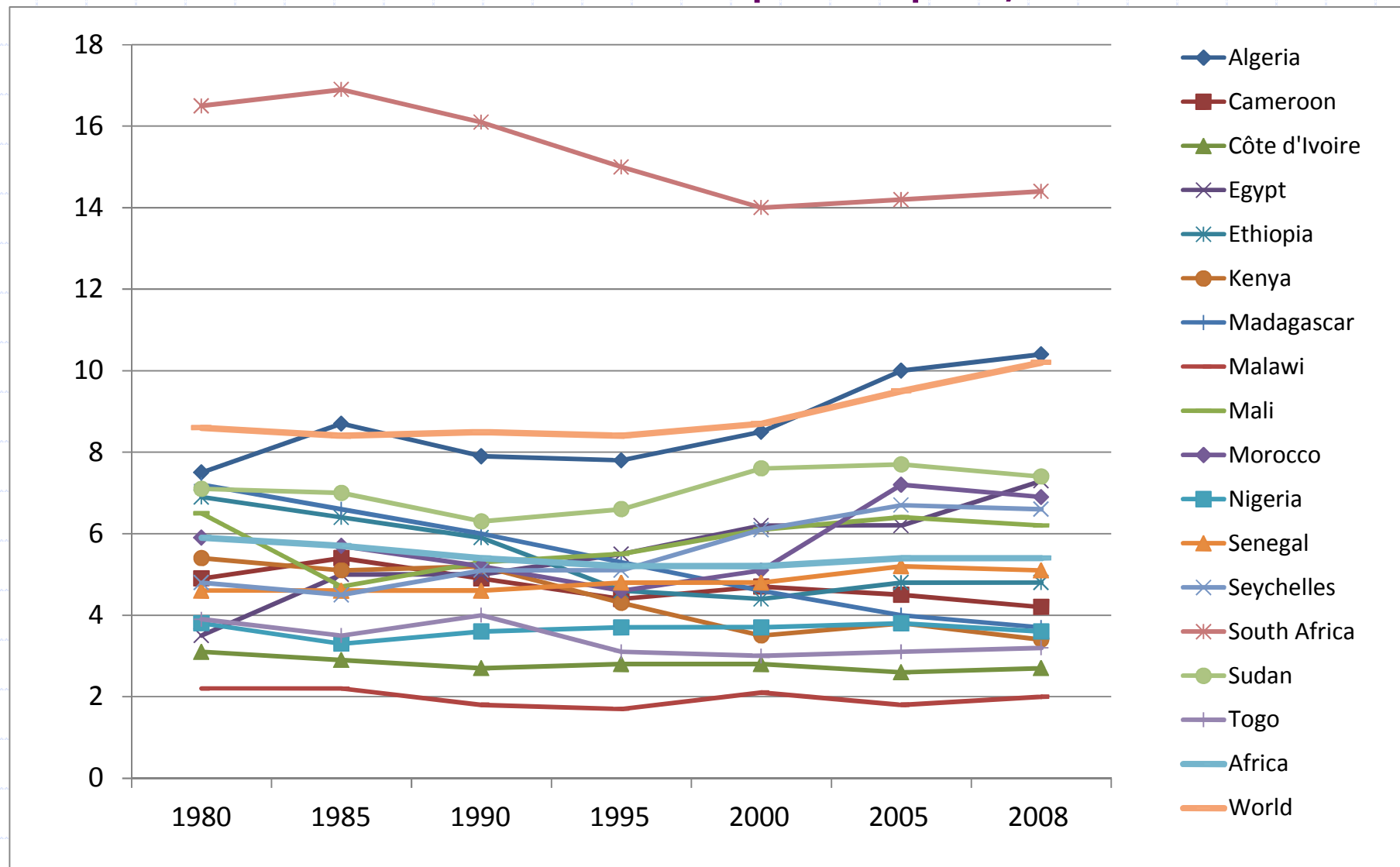


http://seri.at/wp-content/uploads/2012/08/Working-Paper13_Resource-use-in-Africa.pdf

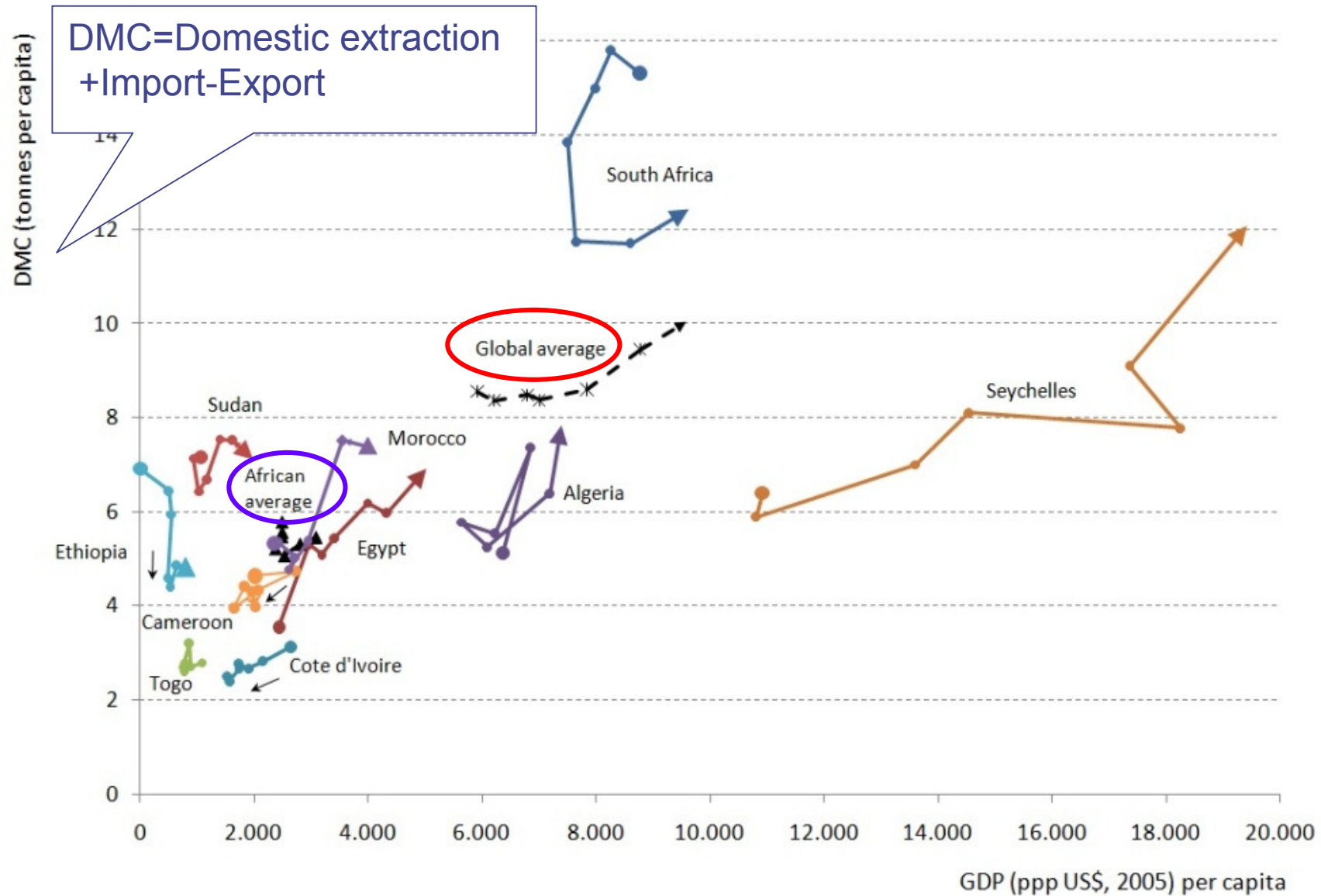
Global and African material extraction (1980-2008)

	Global extraction (billion tons)	1980=100	African extraction (billion tons)	1980=100	16 African countries extraction (billion tons)	1980=100	Share of 16 AC in global extraction	Share of all Africa in global extraction
1980	37.93	100.0	2.83	100.0	1.86	100.0	4.9	7.5
1985	40.49	106.8	3.16	111.7	2.16	115.9	5.3	7.8
1990	44.81	118.1	3.43	121.2	2.37	127.5	5.3	7.7
1995	47.89	126.3	3.70	130.9	2.55	137.2	5.3	7.7
2000	52.66	138.8	4.20	148.5	2.91	156.1	5.5	8.0
2005	61.57	162.3	4.92	173.8	3.38	181.5	5.5	8.0
2008	68.13	179.6	5.29	186.8	3.61	194.2	5.3	7.8

Domestic material extraction per capita, 1980–2008



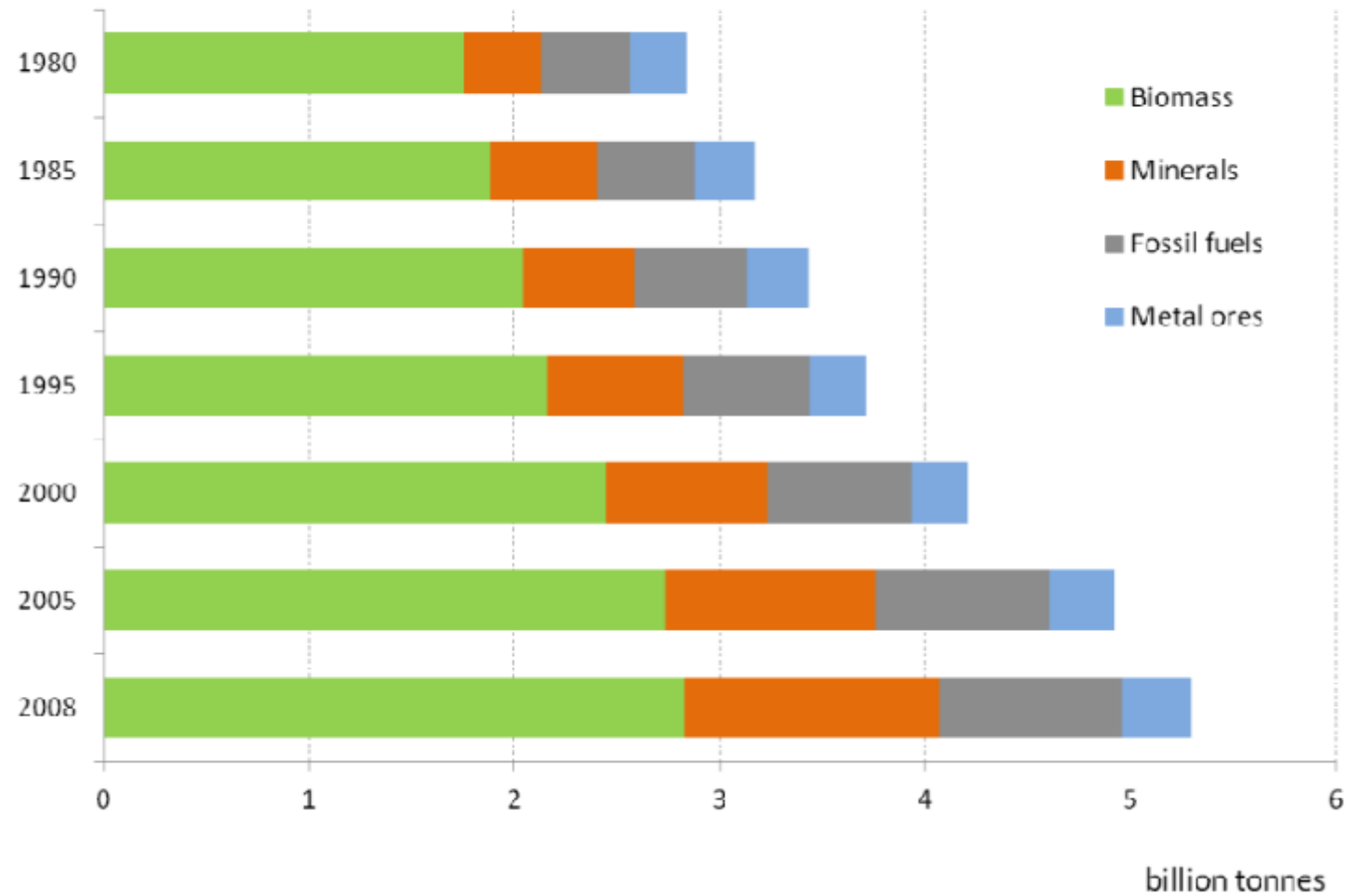
Material consumption (DMC) and GDP, per capita, selected countries and continent (1980-2008)



Source: SERI and Dittrich : Resource use and resource productivity in Africa, 2012

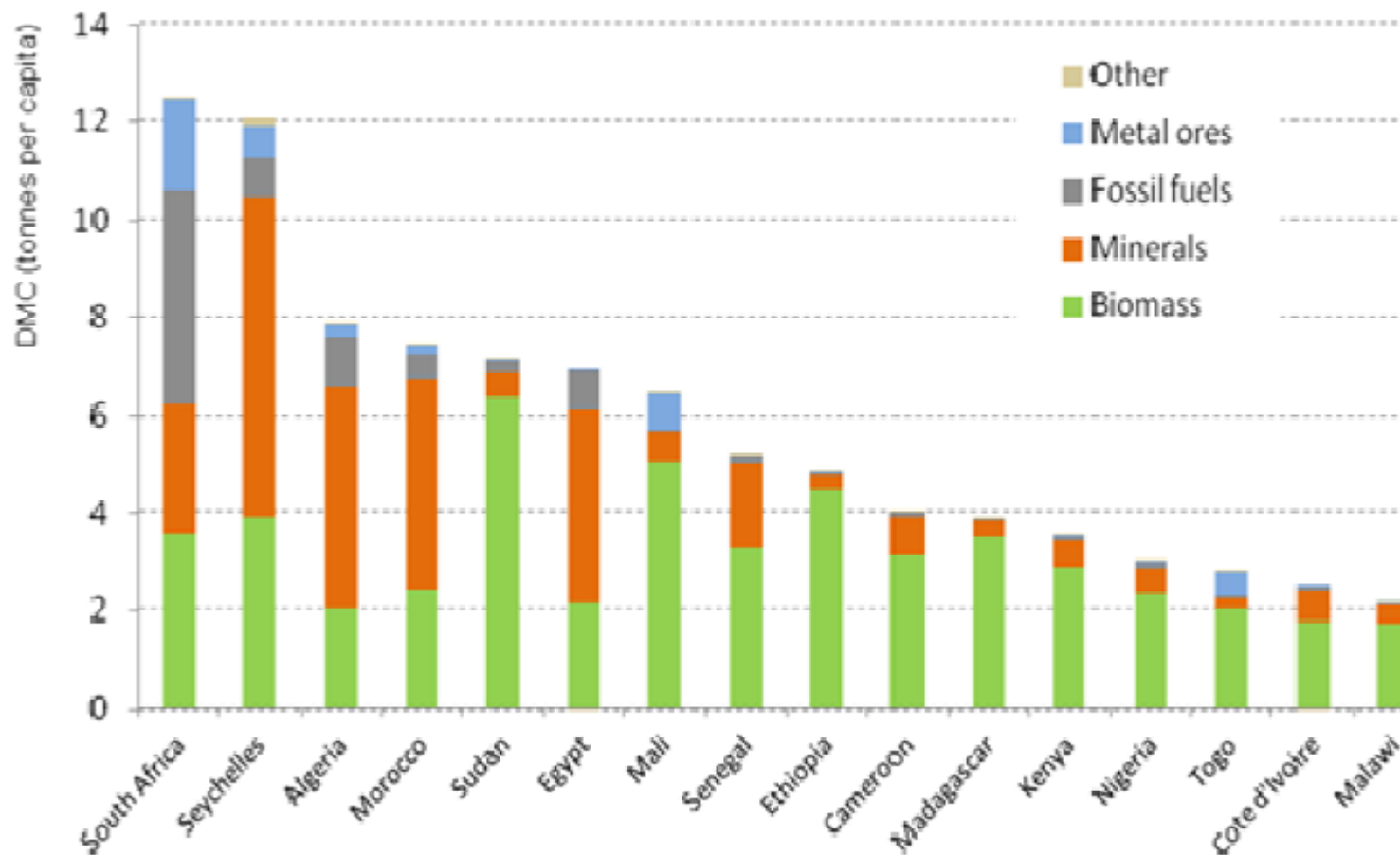
Material extraction by categories

Figure 1a: Material extraction in Africa, 1980-2008



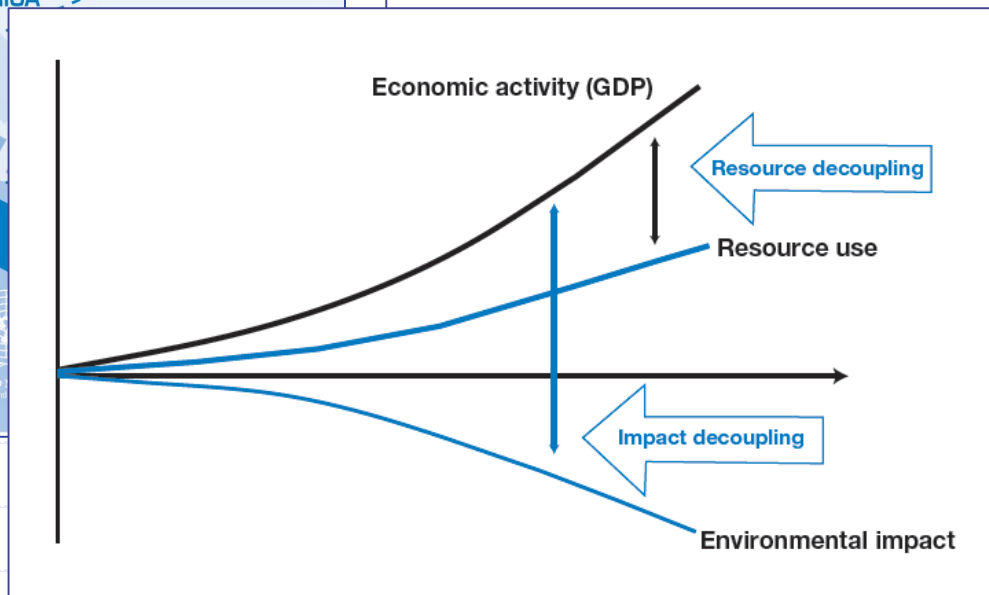
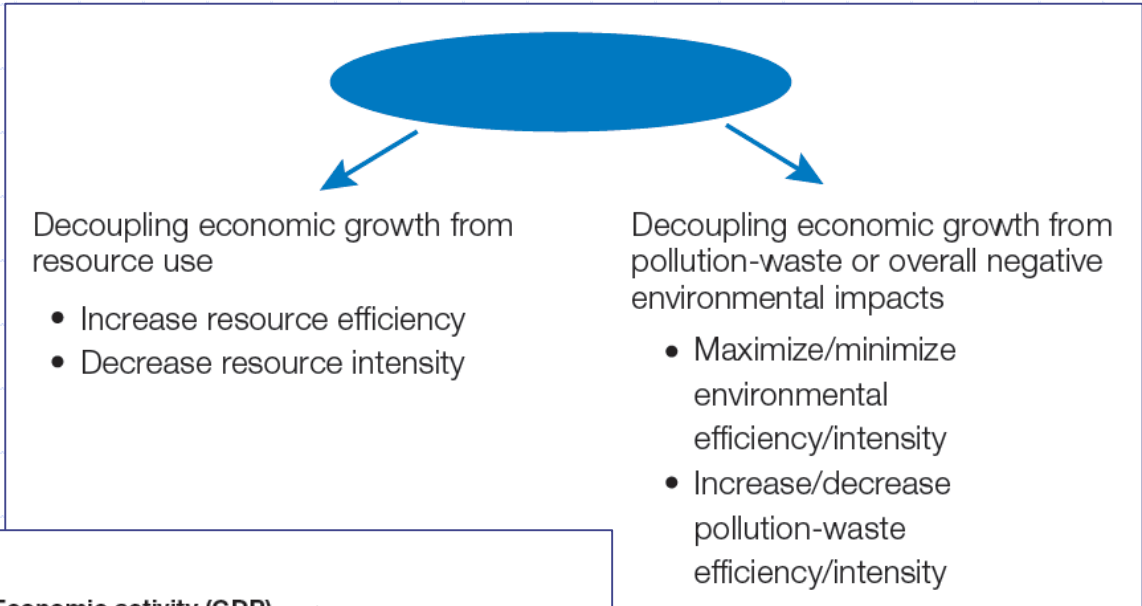
Material consumption per capita according to material categories

Figure 9: Material consumption (DMC) per capita according to material categories (2008)



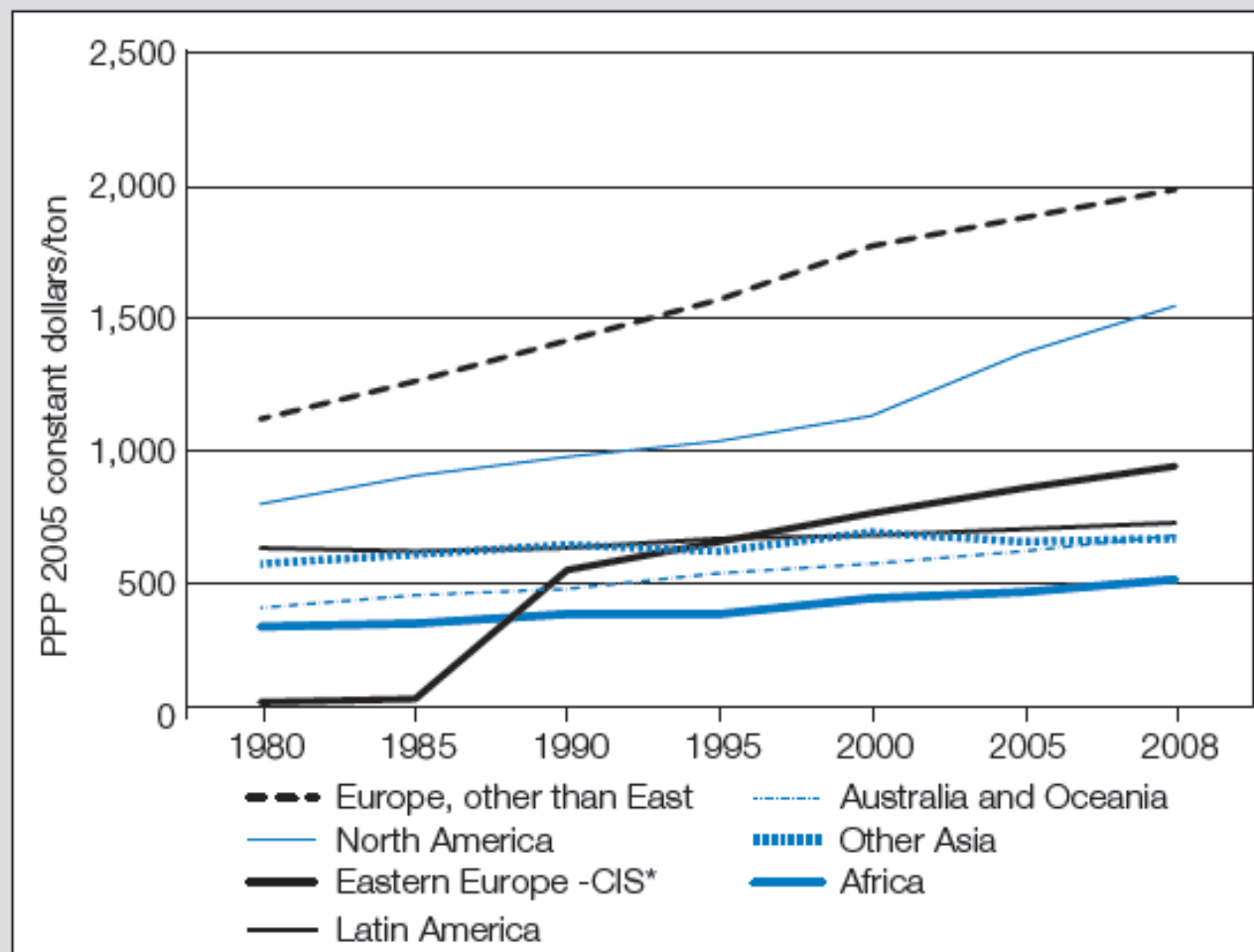
Sources: own calculation based on Dittrich 2011, SERI 2011a

Recent report by UNCTAD addressed “Decoupling”



Source: The Economic Development in Africa Report 2012, UNCTAD/ALDC/AFRICA/2012

**Figure 11. Material productivity, by region, 1980–2008
(PPP 2005 constant dollars per ton)**



Source: UNCTAD (2012b).

* Before 1990 no data were available for GDP of Soviet Union.

Stylized Facts on Resource Use and Productivity in Africa

1. The level of domestic material extraction per capita in Africa is very low compared to the global average.
2. Domestic material extraction in Africa has increased by 87 per cent over the past three decades, but has declined in per capita terms.
3. Biomass accounts for over half of the material extraction in Africa, but the share of non-renewable resources in total material extraction has increased from 38 per cent in 1980 to 47 per cent in 2008.
4. Africa's share of global material trade fell, despite a significant increase in trade volume.
5. Fossil fuels are the dominant material export and import of Africa
6. Africa is a net exporter of non-renewable resources and a net importer of renewable resources.
7. The level of domestic material consumption (DMC) per capita in Africa is about half the global average (10.4 tons per capita), and has decreased slightly from 5.6 tons per capita in 1980 to 5.3 tons per capita in 2008.

Stylized Facts on Resource Use and Productivity in Africa

8. Although domestic material consumption in Africa is increasing, the region accounts for only 7.2 per cent of global material consumption.

9. Non-renewable resources account for a large share of domestic material consumption in African countries that are at a relatively higher level of industrial development.

10. Material productivity in Africa is the lowest for any region in the world. Nevertheless, material productivity in Africa has improved over the past three decades.

11. Energy use in Africa is low and has been increasing much less rapidly than material use.

12. Africa has contributed the least to global greenhouse gas emissions but is the region most affected by climate change.

13. The human impact on natural ecosystems in Africa is generally low but increasing at a rapid rate.

14. Land use processes are found to be largely inefficient over large parts of Africa.

Africa's share of global production and reserves of selected minerals


Mineral	Share of world reserves (%)	Share of world production (%)	Main African producers
Aluminium	3	4	Mozambique, Egypt, South Africa
Cement	-	4	Algeria, Egypt, Morocco, South Africa, Libya, Tunisia
Chromites	12	37	South Africa, Zimbabwe, Madagascar, Sudan
Coal	4	3	South Africa, Zimbabwe
Cobalt	41	60	Democratic Republic of the Congo, South Africa, Zambia
Copper	4	7	Zambia, South Africa, Democratic Republic of the Congo
Iron ore	1	3	South Africa, Algeria, Mauritania
Diamond	56	49	South Africa, Botswana, Democratic Republic of the Congo
Gold	34	18	South Africa, Ghana, Mali
Graphite	0.4	1	Zimbabwe, Madagascar
Lead	1	3	Namibia, South Africa
Natural gas	8	6	Algeria, Egypt, Libya
Manganese	-	23	South Africa, Ghana, Gabon
Oil	10	12	Nigeria, Angola, Algeria, Libya
Phosphate	53	25	Morocco, Tunisia, Egypt
Raw steel	-	1	South Africa, Egypt, Libya
Uranium	15	17	South Africa, Niger, Namibia

Source : Computed on the basis of data from U.S. Geological Survey, British Petroleum, and OECD

Resource abundance: A curse or blessing?

- Is resource abundance a blessing or a curse? Typically, in resource rich countries, domestic fuel prices are lower, and energy intensity of GDP is higher. But they have higher investment in R&D and fixed capital stock, larger foreign exchange reserves and more inflows of FDI. They also have lower budget deficits and lower inflation. These are conducive for long term growth. We also find that **in resource rich countries**, real exchange rate is generally higher, **accumulation of human capital is slower and institutions are worse, especially if they were not strong initially, which are detrimental for growth.**

OECD/UNEP Resource Efficiency Conference in 2008



Conference on Resource Efficiency
23-25 April 2008, Paris, France

CONCLUSIONS BY THE CONFERENCE CO-CHAIRS

by
MARK MWANDOSYA, Minister for Water and Irrigation of Tanzania
and
MASAYOSHI NAMIKI, Vice Minister for Environment of Japan

Ladies, Gentlemen,

The OECD and UNEP co-organised this international Conference on Resource Efficiency on 23-25 April 2008 in Paris. We are very grateful for their initiative. This conference was particularly timely, as many countries (e.g. China, Germany, Japan), the international community (e.g. OECD, UNEP, G8), and key leading companies (e.g. mining, manufacturing, recycling, distribution companies) are aiming to improve resource efficiency, at a time of changes in international materials markets (e.g. increasing international flows, new geography of supply and demand, increasing prices, recycled materials trade) and related environmental concerns.

The Conference explored how improved resource efficiency can reduce negative environmental impacts of resource exploitation, transportation, use and disposal, while at the same time securing adequate supplies of materials to sustain economic growth and reduce poverty. The meaning of resource efficiency in the context of developing countries was

How to draw more added values from the same amount of material resources, by improving efficiency of resource use, by technological and social innovation

Regarding the way forward, we consider that the following is important. Measuring resource efficiency requires operational indicators. There is a need to support statistical agencies in setting up the monitoring systems. Governments need to expand the use of economic instruments. Efforts on sustainable mining, waste management and recycling need to be strengthened, including through international co-operation. Continuing support is needed for the UNEP/UNIDO network of National Cleaner Production Centers, which assist SMEs in addressing resource efficiency. There is finally a need to foster co-operation and partnerships on resource efficiency: (i) among relevant ministries and government departments, members of the private sector, and representatives of the civil society; (ii) at the international level involving the OECD, UNEP, the G8, and others.

11th IRP meeting in Tokyo, Nov. 2012

International Resource Panel meetings



11th IRP meeting in Tokyo, Nov. 2012



**Open Seminar
Green Economy and Resource Efficiency
- Scientific Knowledge of UNEP International Resource Panel and the latest trends of Resource Efficiency Policy -**

The Institute for Global Environmental Strategies (IGES) jointly held a public open seminar with the Ministry of the Environment, Japan and the United Nations Environment Programme (UNEP), on 6 November 2012 in Tokyo. The objectives of this seminar were to

t work done by the International Resource Panel, discuss the future direction of resource efficiency policy, and present opportunities for Japan and other Asian countries. Experts on resource efficiency were invited for a panel discussion.



looked towards future development, outlining the importance of resource efficiency. It presented practical examples to achieve this. It also presented the leapfrogging model as a way for developing countries. The panel discussion discussed resource efficiency policies and the impact of resource efficiency on rice production indicators in Japan and Europe, as well as ways to achieve resource efficiency on a national level through enhancing resource efficiency and reducing greenhouse gas emissions.

6 November 2012, 13:30-16:30 (Doors open at 13:00)

Tokyo Conference Center Shinagawa

Highlighting conclusions of SERI's report

- ◆ Finally, it is unquestioned that African countries need further economic development in order to improve their levels of prosperity and quality of life. Until now the majority of Africans consume predominantly biomass. Development in terms of material use was and is mainly based on a growth of energy consumption, mainly gained from fossil fuels, and on a growth of building and maintaining infrastructure, which leads to growing consumption of non-metallic and metallic minerals. In the light of climate change and increasing scarcities of resources, new patterns of material use for gaining wealth have to be identified and implemented, not only but also for African countries.