Development in a World of Limited Resources

Policy Perspective – A Framework

Decoupling Growth from Natural Resources

Development Alternatives & Wuppertal Institute

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Human & Planetary Well-being

The universal goal that all nations aspire for is **human well-being and development.** Natural resources such as minerals, biomass, air, water, soil, renewable (wind/tidal/geothermal/solar) and non-renewable (coal/gas/shale) energy sources etc form the basis for development. However, a large part of this economic and social development has been achieved through intensive, inefficient and unsustainable utilisation of our planet's limited resources. Such unchecked development has resulted in a global ecological footprint of 1.5 – i.e. the global economy is using resources 50% faster than they are regenerated (refer to figure 1).[1]

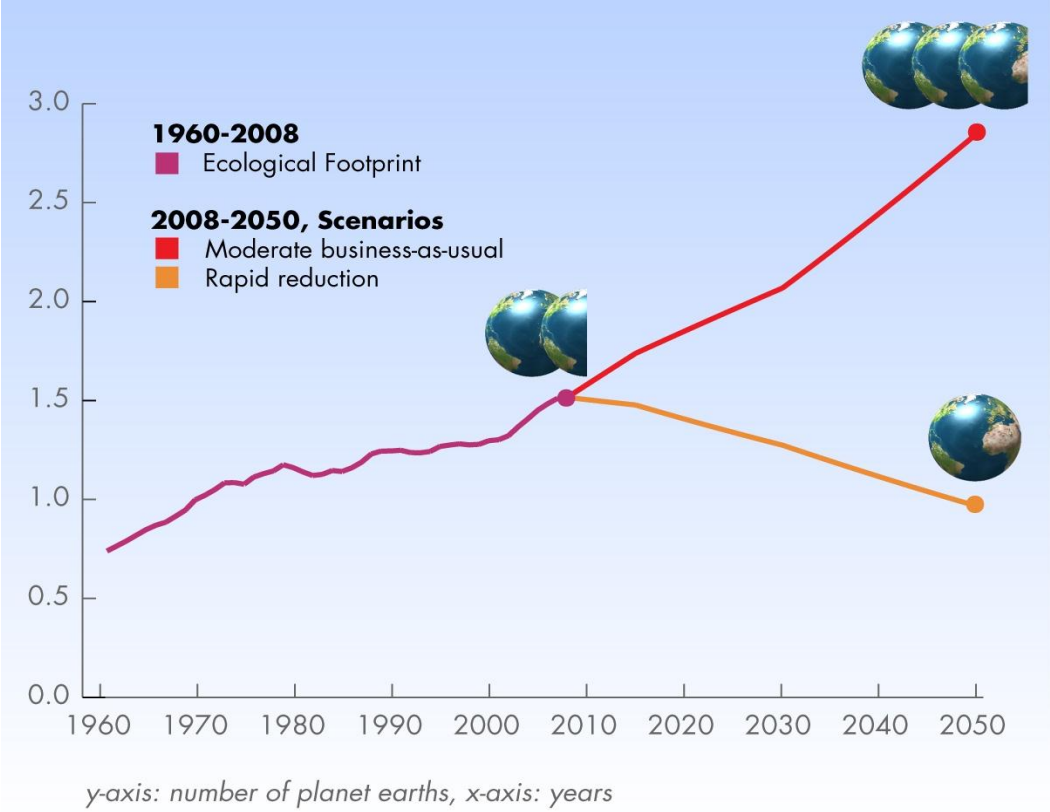

Figure 1: World Ecological Footprint

Source: Global Footprint Network[2]

To fuel this demand for resources, global material use has jumped from 35 billion tonnes in 1980 to nearly 68 billion tonnes in 2009.[3] Total material extraction increased by a factor of about 8 to support a 23-fold GDP growth.[4] Annual extraction of ores, minerals, hydrocarbons and biomass has grown from 7 billion tonnes in 1900 to 60 billion tonnes today and with current trends of population and economic activity, is

[1] Global Footprint Network (2012)

[2] ibid

[3] Sustainable Europe Research Institute (SERI) (2012) *Material Flow Database*

[4] UNEP (2011) *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth*. A Report of Working Group

set to reach 140 billion tonnes by 2050.[5] Specifically, the extraction of construction minerals increased by a factor of 34, industrial ores and minerals by a factor of 27, fossil fuels by a factor of 12 and biomass by a factor of nearly 4.[6]

The Resource Crunch

The challenges of such resource consumption and its impacts are incessantly increasing due to a growing population (estimated to be 8 billion by 2030 and over 9 billion by 2050) with a burgeoning middle class (projected to be 5 billion in 2030), rapid urbanisation and expansion of the production and service sector. This coupled with technology efficiency and level of development (currently measured by the GDP) affects the rate of consumption. Hence, we see the North consuming at a much higher rate than the South. For example, one person in India *consumes* on average, 4 tonnes of resources per year, while one in Canada *consumes* an average 25 tonnes (refer to figure 2).[7]

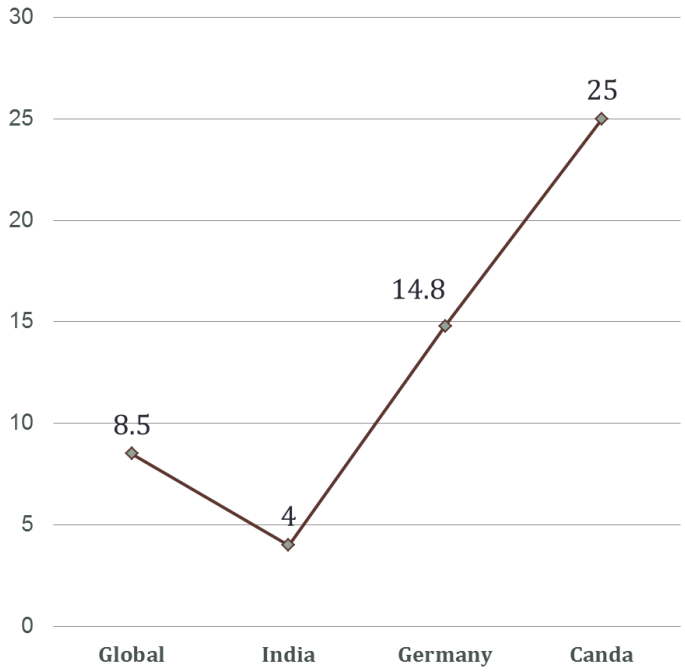

Figure 2: Consumption in DMC/person (2008)

Source: Dittrich et al. 2012 ; UNEP-IRP 2011[8]

[5] ibid

[6] UNEP (2013) *Decoupling in Practice (Decoupling 2)* – Draft (to be published)

[7] Indo German Environment Program (IGEP) (2013*) India's Future Needs for Resources*

[8] UNEP (2011) *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth*. A Report of Working Group

As developing countries prosper and grow, there will be an increasing demand of resources as similar lifestyles and consumption patterns are emulated (as those in the developed nations). A report by the Indo German Environmental Programme (2013) tried to assess India's future material demand under three different scenarios, ranging from 17 billion tonnes to 47 billion tonnes (refer to figure 3). [9]

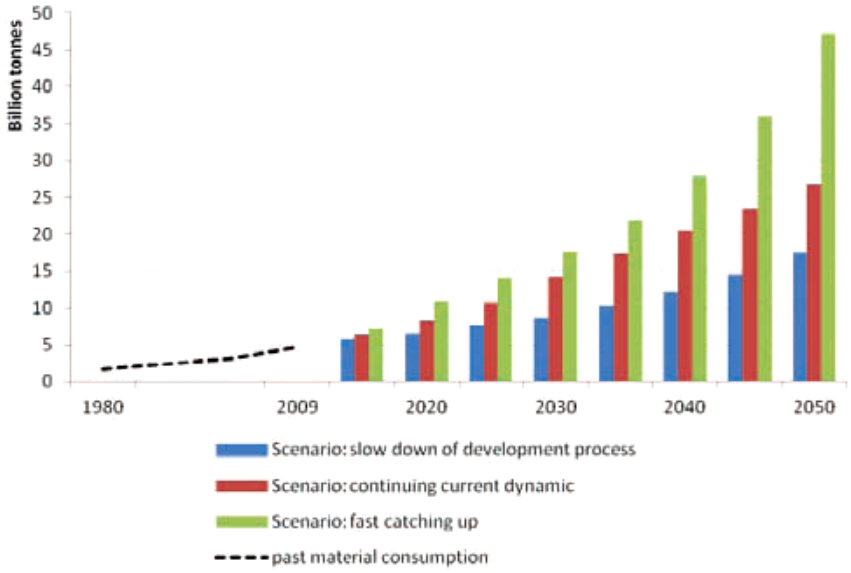

Figure 3: India's Past & Future Projections of Material Demand

Source: Indo German Environment Programme, 2013[10]

Furthermore, negative effects of excess demand can be seen in the form of rising prices of our limited resources (refer to figure 4). Since 2000, metal prices have increased by 176%, rubber prices by 350%, energy prices by an average of 260%, and food prices by 120%.[11] Global food prices are predicted to increase by 120-180% by 2030, accelerating past trends in price rises base year.[12] This will translate into higher prices for goods and services which in turn can harm economic growth, efforts to reduce poverty and food security, etc.

[9] Indo German Environment Program (IGEP) (2013*) India's Future Needs for Resources*
[10] ibid
[11] McKinsey Global Institute (2011) *Resource Revolution: Meeting the World's Energy, Materials, Food, and Water Needs*
[12] Willenbroeckel et al 2011

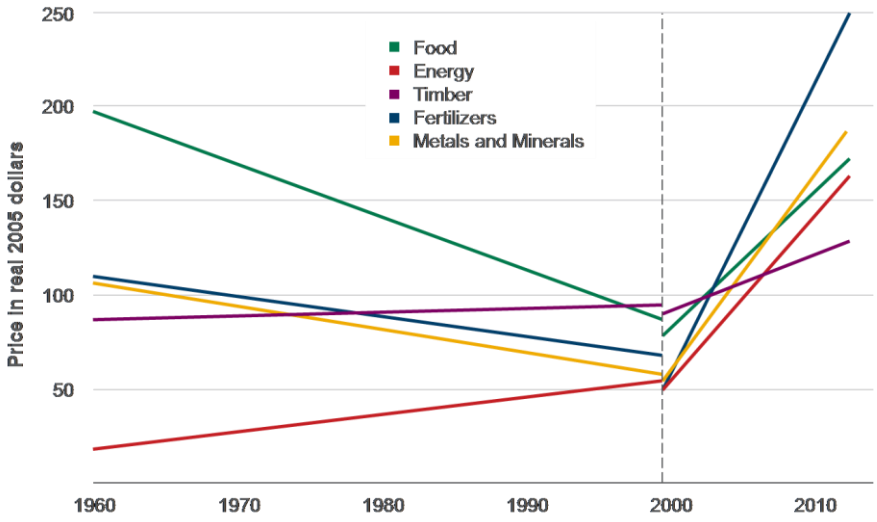

Figure 4: Price Trends of Major Commodity Bundles (constant, $ 2005)

Source: WRI chart using World Bank data, 2012

Needs of the Next 9 Billion – The Growth Imperative

Inequality across the globe is increasing. Nearly 80% of the population lives on less than US$ 10 a day with 40% subsisting on less than US$ 2 per day.[13] Global inequalities are manifested not just in terms of economic benefits but also in access and use of natural resources. For example, in India the access to water and sanitation facilities to urban poor are far lower as compared to the urban non-poor (refer to figure 5). A similar trend has been observed with other developing countries.

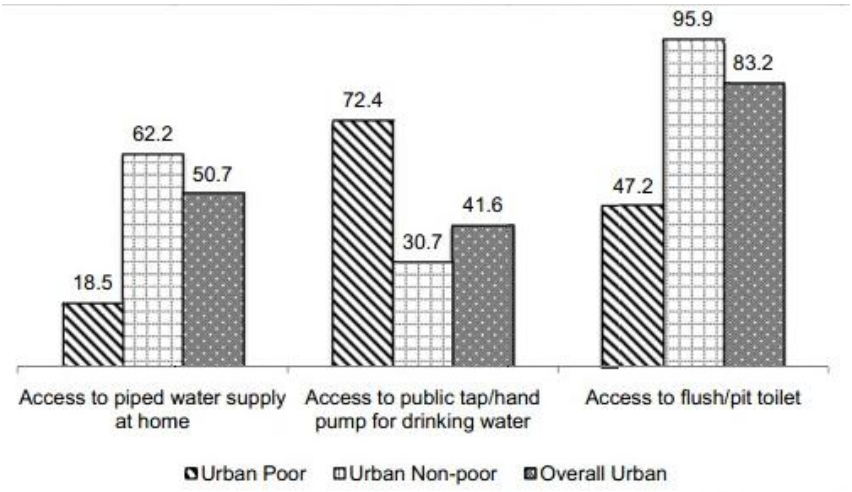

Figure 5: Access to Water & Sanitation by Urban Poor in India

Source: NFHS-3 and NFHS-2 compiled by UHRC

[13] World Development Indicators, 2008

Furthermore, a reduction in stocks of natural capital and flows of ecosystem services disproportionately harms the well-being of the poor and resilience of their communities. At the same time, the poor also exert a negative impact on the environment in order to meet their basic needs, damaging the productivity of the ecosystem.[14]

A vicious cycle of impoverishment of man and environment has been created. The most imminent problem therefore is how can we grow while eradicating poverty and meeting the needs of 9 billion people in 2050 in terms of energy, land, water and material supply, while stemming climate change, biodiversity loss and health threats.

Decoupling Resources from Growth

The key to the above problems lies in managing resources sustainably. This can be achieved through **decoupling natural resource use and environmental impacts from economic growth**. Decoupling implies removing the link between two variables. It signifies resource efficiency as a key strategy for creating a green economy.

The International Resource Panel[15] distinguishes between two forms of decoupling (refer to figure 6):

A. Resource decoupling (or **increasing resource productivity**)

It means reducing the rate of use of (primary) resources per unit of economic activity. This understanding of 'dematerialization' is based the concept of using less material, energy, water and land for the same economic output, and it is connected with an increase in the efficiency with which resources are used. Resource decoupling seeks to *"alleviate the problem of scarcity and responds to the sustainability challenge of intergenerational equity"* by reducing the rate of physical resource depletion, while simultaneously helping to reduce costs by raising resource productivity.

B. Impact decoupling (or **increasing eco-efficiency**)

It means raising economic output while reducing negative environmental impacts that arise from the extraction of required resources (such as groundwater pollution due to mining or agriculture), production (such as land degradation, wastes and emissions), use of commodities (such as transport resulting in CO2 emissions), and in the post-consumption phase (wastes and emissions). Methodologically, these impacts can be estimated by life cycle analysis (LCA) in combination with various input-output techniques. However, it is very demanding to measure impact decoupling at an aggregate system level such as an economic sector or the national economy. Many environmental impacts need to be considered, their trends may be quite different or not even monitored over time, and system boundaries as well as weighting procedures are often contested. Impact decoupling entails using resources better,

[14] UNEP-IRP (2014) *Managing and Conserving the Natural Resource Base for Sustained Economic and Social Development*

[15] The UNEP-hosted International Resource Panel (IRP) was established in 2007 to provide independent, coherent and authoritative scientific assessments on the use of natural resources and its environmental impacts. The Panel is constituted of eminent experts from all parts of the world, bringing their multidisciplinary expertise to address resource management issues.

more wisely and more cleanly. Reducing environmental impacts does not necessarily have a mitigating impact on resource scarcity or production costs, and may even sometimes increase these.

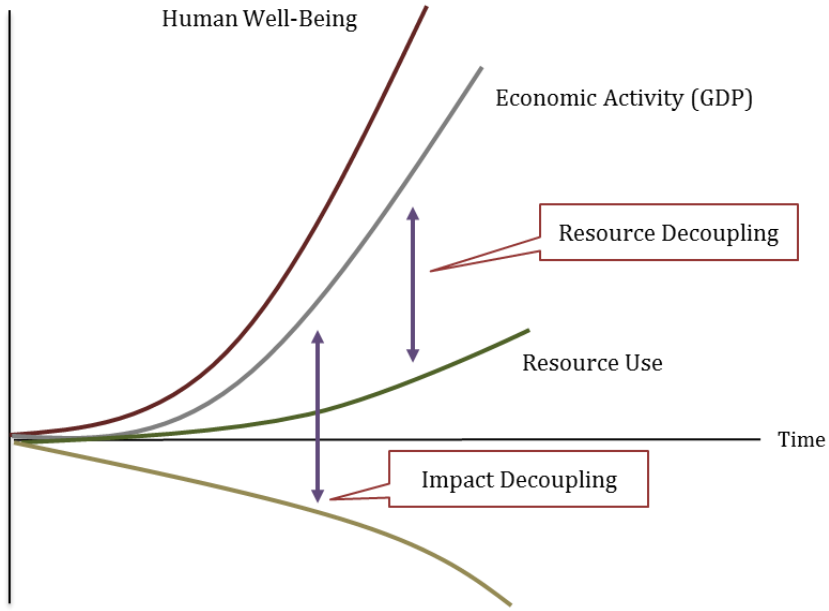

Figure 6: Resource & Impact Decoupling

Source: UNEP-IRP, 2011[16]

For example, some of the good experiences on decoupling from across the globe include[17]:

- **Water**: In Australia, where GDP rose by 30% and water consumption was reduced in absolute terms by 40% during the same short period from 2001 to 2009.
- **Steel**: 80% reductions in greenhouse gas emissions can be achieved in the recycling of scrap iron by switching to state of the art electric arc furnace system, with improved process control, oxy-fuel burners, and post-combustion processes etc.
- **Cement**: It is possible to reduce energy and process related carbon dioxide methods by 30% globally.
- **Paper & Pulp**: Fossil fuel use by the US pulp and paper industry declined by more than 50% between 1972 and 2002, largely through energy efficiency measures, power recovery through co-generation and increased use of biomass.

[16] UNEP (2011) *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth*. A Report of Working Group

[17] UNEP-IRP (2014) *Managing and Conserving the Natural Resource Base for Sustained Economic and Social Development*

Another important distinction has to be made especially from a country specific macro perspective between relative and absolute decoupling (refer to figure 7).

A. **Relative Decoupling** of resources or impacts means that the growth rate of resource use or impacts is lower than the growth rate of a relevant economic indicator (for example GDP)

B. **Absolute decoupling** means that resource use declines, irrespective of the growth rate of the economic driver

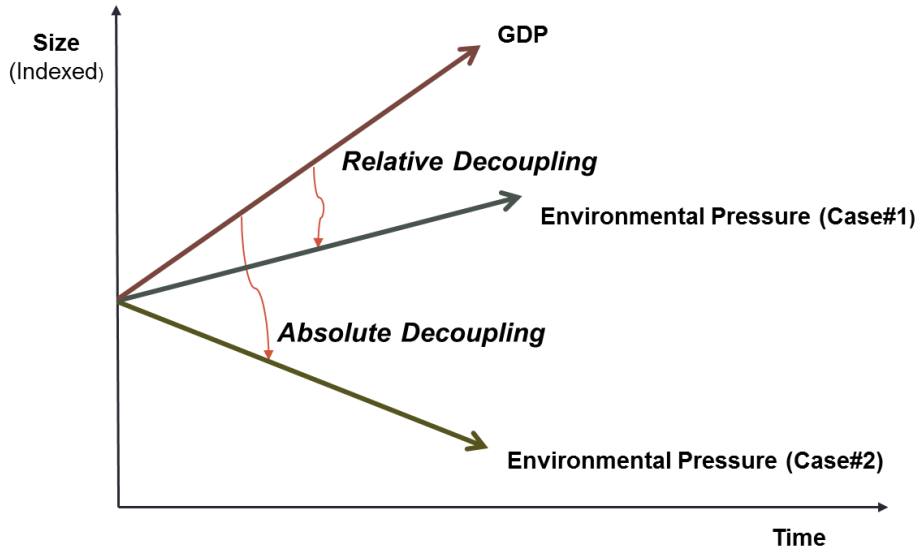

Figure 7: Relative vs Absolute Decoupling

Source: UNEP-IRP (2011)[18]

In implementation of decoupling, differentiation will be required with respect to level of development of a country as well analysing the socio-economic patterns especially the consumption trends. The **developed economies**, characterised by high consumption levels, enjoying high levels of material comforts and access to opportunities **co-exist** with **underdeveloped** poverty stricken communities in almost all geographies today. The figure below (refer to figure 8) shows how the developed countries scores high on Human Development Index (HDI) while concurrently are exceeding the available bio-capacity whereas the developing countries are lagging behind on HDI with a lower ecological footprint.

[18] UNEP (2011) *Decoupling Natural Resource Use and Environmental Impacts from Economic Growth*. A Report of Working Group

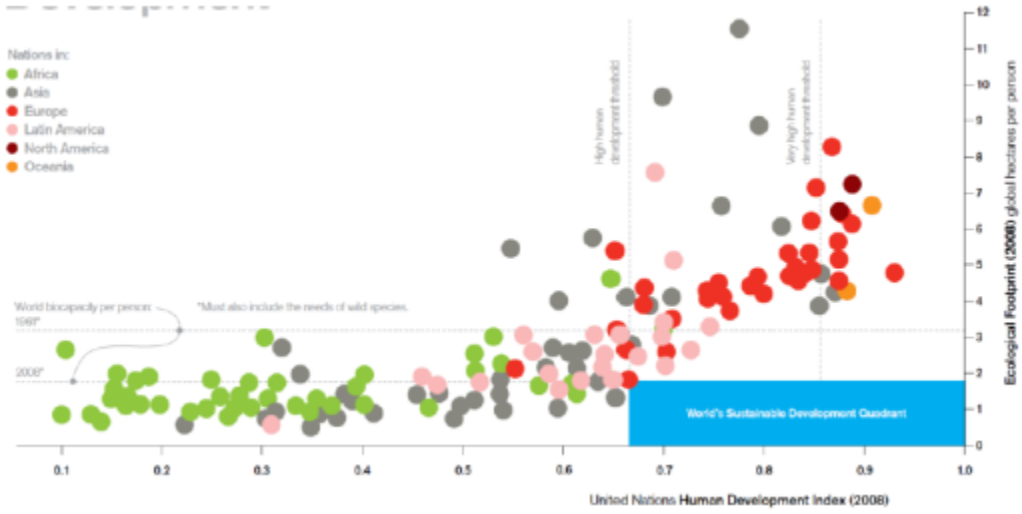

Figure 8: Human Development & Ecological Footprint

Source: Global Footprint Network, 2011

Hence, the challenge for **developed countries** is **maintaining** and **distributing** prosperity more equally while finding ways to dematerialize the economy and society through **absolute decoupling**. In **developing economies**, besides **relatively decoupling**, the challenge is how to **foster** an economic system that meets the needs of people in a way that is compatible with long-term resource conditions, rather than copying mindlessly the unsustainable production and consumption trajectories of the present day developed economies.

When applied in practice, sometimes, decoupling faces the problem of **rebound effect**, commonly referred to as the **Jevon's Paradox**. Simply stated, it is the when **efficiency gains** are **outweighed** by the increases in consumption. Usually these are driven by prices - innovative technology helps in lowering prices which in turn motivates increases in consumption. These may be direct or indirect effects that neutralise the resource productivity increases. Thus, to successfully decouple economic growth from resource consumption there is a need to achieve clarity of purpose and create policy change to support the same. These must be based on, besides efficiency, the principles of consistency and sufficiency also (refer to figure 9).

Figure 9: Decoupling Ladder

While efficiency implies *more with less*, consistency incorporates the notion *better than more*. Consistency takes a cradle to cradle approach that involves accounting for externalities. As Bartkowski (2012) states "*…efficiency and consistency are more or less technological strategies that primarily require innovative changes in the production structure…sufficiency is more of a philosophical strategy"*.[19] Sufficiency requires a change in people's lifestyles and mind-sets promoting the belief that *less can be better* (refer to figure 10). Evidence of the sufficiency principle is seen in OECD countries where after a certain threshold rising GDP is decoupled from life satisfaction. For example, instead of growing in parallel with GDP, indicators of life satisfaction remain at a constant level up from the 1970s, as shown by the Genuine Progress Indicator. This figure reveals that for 17 countries the GDP/capita and the GPI/capita developed in parallel from 1950 until about 1978, but then they decoupled dramatically.

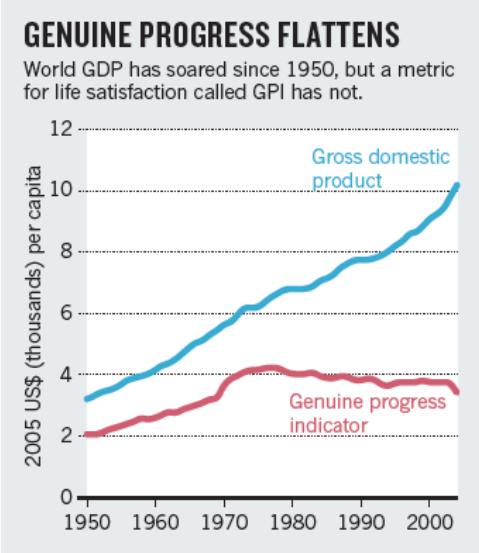

Figure 10: Gross Domestic Product vs Genuine Progress Indicator

Source: Costanza et al 2013[20]

Vicious to Virtuous Cycle

Tapping into resource management potential creates a virtuous cycle which not only offers contributions towards the environment but also strengthens the social and economic pillars of sustainable development. It helps in:

A. **Eradicating poverty** – by breaking the vicious circle of over-consumption, environmental degradation and poverty

B. **Ensuring food security** – by adopting sustainable agricultural practices

[19] Bartkowski (2012) *From Efficiency to Consistency, from Consistency to Sufficiency.* The Sceptical Economist. http://zielonygrzyb.wordpress.com/2012/05/08/from-efficiency-to-consistency-from-consistency-to-sufficiency/

[20] Costanza et al (2013) *Development: Time to leave GDP behind*. Nature 505: 283–285

C. **Achieving universal access to safe & clean habitat, water & sanitation** – by developing systemic sectoral coordination for resource efficient infrastructure

D. **Securing access to universal energy** – by incorporating energy efficiency measures and enhancing renewable energy use

E. **Promoting inclusive economic development** – by creating sustainable livelihoods through diversification of economy

Moving Towards Well-Being – A Nexus Approach

The transition towards decoupling must be undertaken with a view to develop systems such that there is well-being for all while sustainably utilising our natural resources. The current siloed approach to our developmental problems needs to be abandoned. There are interdependencies amongst resources which need to be recognised while decoupling economic growth from natural resources. Given the many dots that need to be connected in this cyclic process, it is best handled as a systems problem.[21] It is no longer only about the trade-offs but about making the inter-connections, generating benefits manifold. The adoption of a **nexus approach** will promote efficient and sustainable resource management across critical materials and resources systemically. A nexus approach is one that integrates management and governance across sectors and scales.[22]

In principle, the opportunities to use resources more efficiently are huge. However, these must be juxtaposed with costs involved which will necessitate prioritising certain sectors and resources. One possible way is to apply an input-output framework[23] that can help isolate the key sectors from others that are resource intensive. McKinsey identified 15 groups of opportunities for fostering resource productivity and calculated their total resource benefit[24] as well as their cost/benefit ratios. It turns out that about 75% of the total resource savings potential in 2030 could – taken a societal perspective – be implemented with an attractive cost-benefit ratio between 1.2 and 0.2 (refer to Figure 11). It shows that one of the highest resource benefits can be accrued from enhancing energy efficiency in building equivalent to $696 billion, with an average societal cost efficiency[25] of 0.5.

[21] Wuppertal Institute (2013) *Economy of Sufficiency*. Essays on wealth in diversity, enjoyable limits and creating commons

[22] Stockholm Environment Institute, 2011

[23] This takes into account the fragility and scarcity of resources juxtaposed with the demand for that resource in order to prioritise resource management strategies

[24] Benefits in terms of- job creation, carbon savings etc

[25] Annualised cost of implementation divided by annual total resource benefit

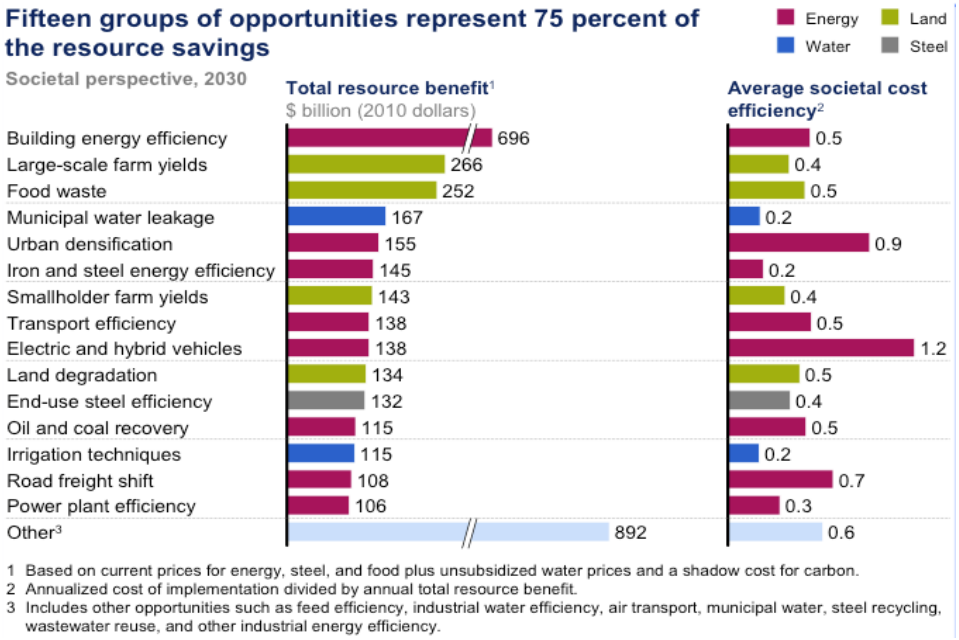

Figure 11: Resource Saving Opportunities by 2030

Source: McKinsey, 2011[26]

Furthermore, research by Wuppertal Institute (2011) identified five product groups that are responsible for majority of resource use at the final consumption end of Europe's economy: construction; food, beverages and tobacco; agriculture, forestry and fishing; electricity, gas and water and coke, refined petroleum products and nuclear fuels. Regarding their economic performance, the identified five product groups represent 18% of the consumption expenditure and two-thirds of resource use in the examined EU countries in 2005. This also makes them some of the most resource-intensive product groups. In the Indian context also, construction, industry (especially manufacturing and power generation) and agriculture are energy and resource intensive sectors.[27]

Based on the above studies and discussions held during the 2nd Indo German Expert Group Meeting (IGEGM), the expert group validated certain key sectors and resources for decoupling. The matrix below highlights the nexus and interdependencies between these sectors and resources (see figure 12).

[26] McKinsey (2011) *Resource revolution: Meeting the world's energy, materials, food, and water needs.*

[27] SERI et al (2009) *Overconsumption? Our use of the World´s Natural Resources.* Vienna/Brussels and BIS (Department of Business and Innovation) (2011*) Potential for Resource Efficiency Savings for Business*

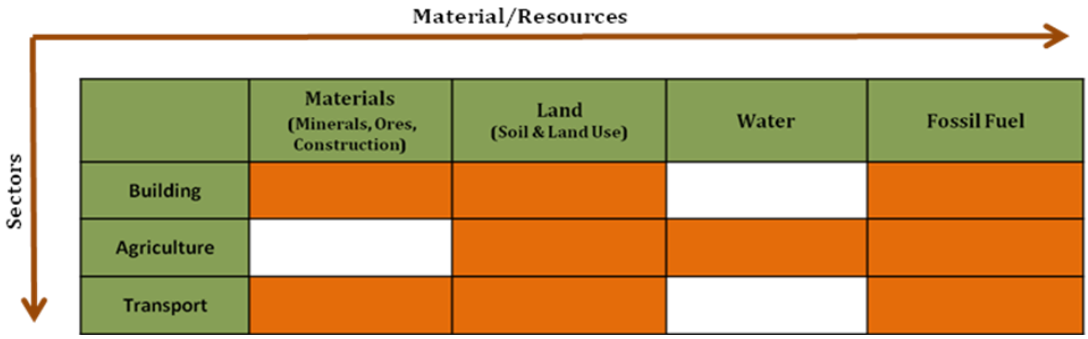

Figure 12: Matrix Representation

Furthermore, it is imperative to jointly identify technical, societal and structural leap-frog options for sustainable production and consumption between developed and developing countries. The challenge for emerging economies like India is to find a way to circumvent the lock-jam of highly capital intensive unsustainable infrastructures. For example, looking at role of embodied energy and alternative materials in building sector. On the contrary, the challenge for developed countries like Germany is to dematerialise via retrofitting existing infrastructure. This will necessitate research based political consultancy because turning the juggernaut is a slow process.

Building Sector in India

Globally, the building and construction sector accounts for 30% - 40% of all material flows.[28] This holds true for a rapidly developing country like India. Besides, resource intensive this sector is extremely energy intensive accounting for 24% of the greenhouse gas emissions.

Bricks form the backbone of building sector. Every year 350 million tonnes of fertile top soil are used to meet the demand of 150,000 billion bricks. With growing populations and increasing urbanisation pressures, the demand for buildings and therefore building materials like bricks will escalate. This escalating soil consumption competes heavily with agriculture, threatening food security. The systems diagram (refer to figure 13) shows the resource competition, focusing on soil and its role in the building and agriculture sectors. In order to meet the annual demand of bricks in the country, fertile soil from over 194 sq. km. of land will be burnt. In an alternate scenario this could lead to the production of enough cereal that can meet the complete nutrition requirements of almost 200,000[29] people. While a drop in the ocean, it is a significant figure when we take into account the current food security concerns facing the country.[30]

Besides the aspect of soil fertility, land use is also an important concern. The same limited resource of land is used for the purposes of constructing buildings, growing food and mining minerals for various

[28] UNEP SBCI 2009

[29] Based on the calculations done by Development Alternatives

[30] Over 7,000 Indians die of hunger everyday (www.bhookh.com)

activities including construction (soil for bricks). The footprint of urbanisation and industrialisation vs. agriculture and food production needs to be balanced out. Similarly there are other resources like water and energy that have competing uses.

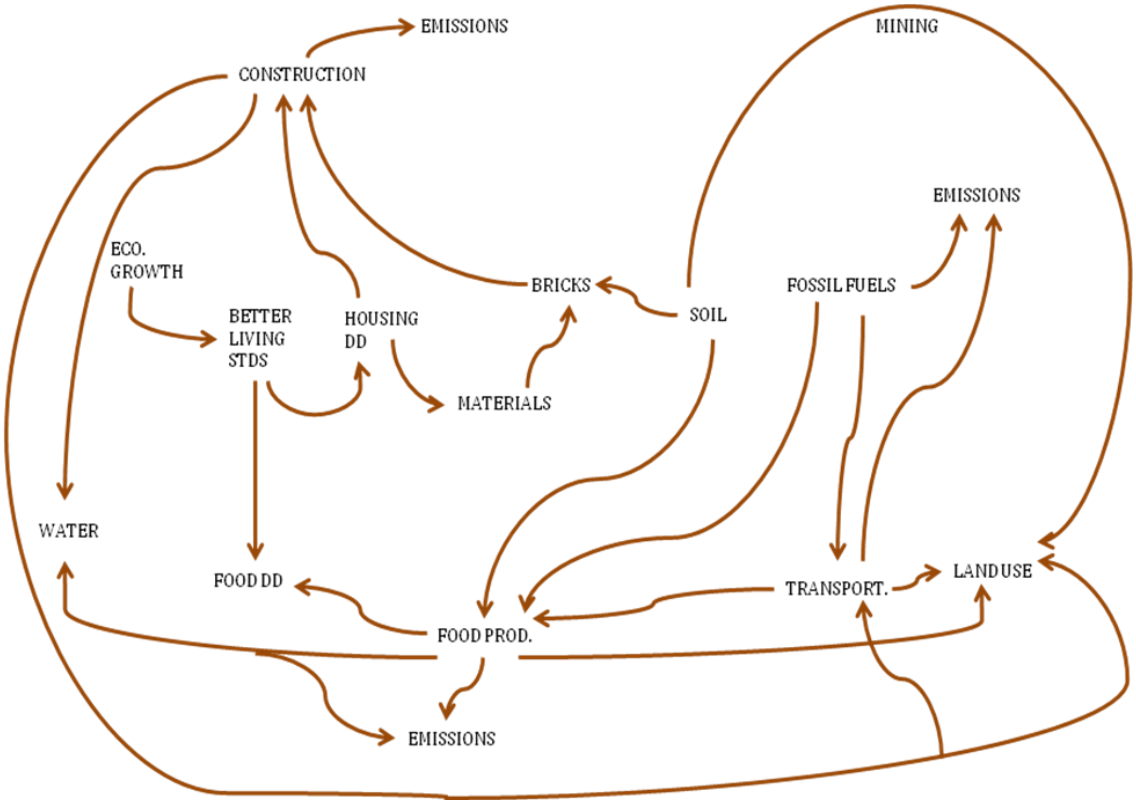

Figure 13: Systems Representation[31]

A nexus approach will provide a holistic understanding of trade-offs with respect to resource management choices thereby increasing productivity, efficiency and other gains manifold. Such an approach is also expected to address the concerns emerging out of rebound effects of increased efficiencies in one resource say energy, leading to over exploitation of materials or water due to increased productivities and reduced costs of production. This calls for there is a need to build cooperation, co-ordination and integration among different stakeholders and sectors. Key drivers of action are required to facilitate improvement in resource management.

Drivers of Action

Systemic thinking helps identifying drivers of actions. An effective driver of action is one that not only reverses the vicious cycles but is also capable of generating virtuous cycles by overthrowing the vested interest of powerful lobbyists[32] and break down the structural barriers such as systemic lock-ins and

[31] This is not a representation of the complete system, but a snapshot with respect to one resource.

[32] Wuppertal Institute (2013) *Economy of Sufficiency*. Essays on wealth in diversity, enjoyable limits and creating commons

market failures. These drivers of action aim to cohesively bind together the objectives of socio-economic development with sustainable environment management.

To successfully decouple, following drivers have been identified:

A. Technology & Innovation- *fostering greening of industry and competitiveness*

Key enabling technologies exist in the areas of biotechnology, advanced materials, nanotechnology, photonics and micro and nano-electronics. Carbon capture and storage systems as well as systems of carbon capture and re-use have also been highlighted as key activities.[33] Application and adaption of information and communication technology (ICT) in construction, energy or transportation sectors has already led to radical innovation in the ways things are done. It is estimated that ICT can help mitigate around 13% man-made GHG emissions resulting from transport by reducing travel needs, influencing travel choices, changing driver and vehicle behaviour, increasing network efficiency and increasing vehicle load factor.[34] In the future, innovations like the internet of things, machine-to-machine communication and radio-frequency identification devices (RFID) could be used in collaboration with other sectors to develop new and creative applications.

B. Capacity Building of Stakeholders- *generating knowledge and create skills for the transition*

Among the most important internal barriers to material efficiency encountered by companies is a lack of knowledge and skills. Awareness on material efficiency and knowledge on how to create a successful green business model is low. Time is also a problem, especially in Micro, Small and Medium Enterprises with limited capacity to concentrate on activities outside of their core business.[35] In this sense, investment in awareness raising and skills development is an important precondition for promoting resource efficiency in companies. To this end, the structure of universities with rigid disciplinary orientation and institutional inertia needs to be revisited to equip the next generation of scholars, entrepreneurs and employees to handle challenges of the future.

C. Finance (Capital)- *channelising investments and incentives for a sustainable transition*

A major bottleneck for the diffusion of green technologies and expertise is financing. Thus, finance and finance structures are key to providing the means for investing in a sustainable transition towards a green economy. In Europe, an identifiable trend suggests that government support for clean technology equity financing is gaining importance. [36] New approaches urgently need to bring together technical and financial experts in order to develop and implement business models and innovative financing schemes. A key question for further research is how to finance innovations with long-term paybacks, when profits for the company are needed over the short term.

[33] EC 2009 ; Bringezu (2009) *Visions of a Sustainable Resource Use*. In: Bringezu, S. and R. Bleischwitz (eds). Sustainable Resource Management: Global Trends, Visions and Policies

[34] OECD (2012) *The Future of Eco-Innovation: The Role of Business Models in Green Transformation*

[35] Nordic Innovation (2012) *Green Business Model Innovation: Empirical and Literature Studies* ; EC (2011) Attitudes of *European Entrepreneurs Towards Eco-Innovation.*

[36] EIO (2012) *Closing the Eco-Innovation Gap: An economic opportunity for business*

D. Social Action & Behaviour Change- *encouraging sustainable production and consumption*

How business and governments are run, especially in rich countries, are key to meeting future demands with limited resources. Currently businesses (especially large businesses) typically treat environmental issues as an externality and not as part of their core business. Integrating environmental sustainability in value creation and distribution leads to a restructuring of value chains and new types of producer-consumer relationships.[37]

Similarly, the organisation of public administration into ministries and agencies dealing with individual issues separately hinders coherence, cooperation and systemic solutions and may lead to opposing objectives (perverse subsidies). To overcome such institutional lock-ins, changes in the organisation of government may be necessary along with strong leadership and overarching targets.

Lifestyle changes particularly in rich countries are needed to create demand for new and green innovations to pave way for the political willpower needed to instigate structural change. This includes changes in behaviour and introducing new forms of interactions between people. While people might be willing to make changes, they also need the tools to be able to implement those changes. Therefore, policies at the structural level are needed to provide infrastructure, means and information for people to be able to make more sustainable changes in their lifestyles.

E. Policy and Regulation- *building frameworks and providing roadmaps for change*

They need to play a dual role for promoting decoupling. Policies need to build the framework and set an overall direction for change. This includes stating clear and binding targets for resource use and emissions (related to planetary boundaries) and creating a level playing field for eco-innovators by recognising both economic and environmental costs and benefits of their activities. Secondly, policies provide support for eco-innovation through science, innovation and enterprise, as well as through green public procurement and public-private partnerships.

Building Sector in India & Drivers of Action

The resource competition amongst the various sectors necessitates resource substitution. In the building sector, the replacing soil by flyash is one of the potential solutions for decoupling. Flyash a by-product of thermal power plants can be used to make quality bricks in conjunction with sand, cement or lime and gypsum.[38] Substituting burnt clay bricks with flyash bricks will reduce the pressure on the soil resource that can then contribute to meeting food security concerns (refer to figure 14). Moving away from coal reduces greenhouse gas emissions and therefore its impacts on climate change.

[37] OECD (2012) *The Future of Eco-Innovation: The role of Business Models in Green Transformation* and EIO (2013) *Europe in Transition: Paving the Way to the Green Economy through Eco-Innovation*

[38] While flyash is an alternative to decouple soil from brick-making, there are certain trade-offs that need to be addressed: What is the existing stock of flyash?; What are its competing use and how do they effect the decoupling potential in the brick sector? Does encouraging flyash imply encouraging coal fired power plants?; How does the movement from fossil fuel to renewable energy sources affect this decoupling? These are questions that should be dealt with in the research based political consultancy.

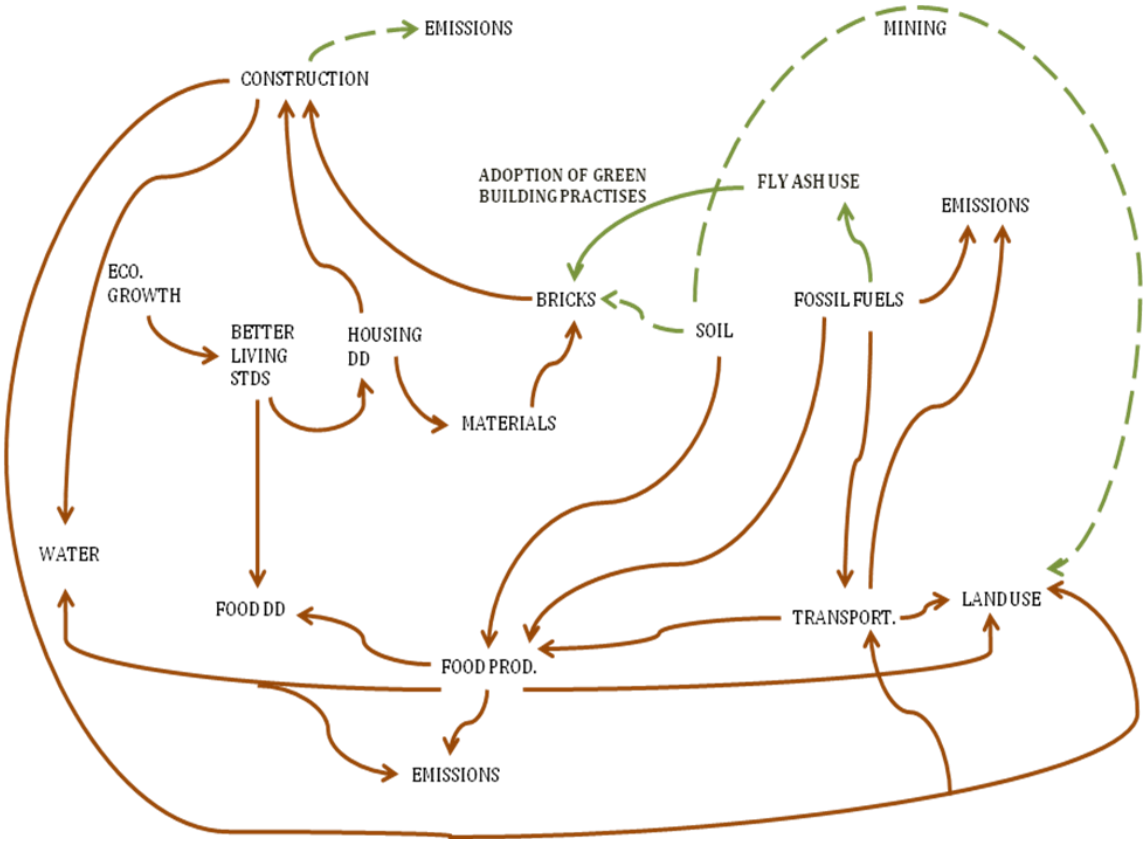

Figure 14: Introduction of Flyash into the System

Flyash has been used successfully in select pockets in India, Germany and China.[39] The key drivers of action that facilitated the mainstreaming of this option are:

- *Technology and innovation* for developing equipment and process to produce quality building bricks. There are also aspects of innovation in the product quality and application as well as the delivery systems to take the innovation out to scale.
- *Training and capacity building* of key stakeholders is essential to ensure that the impacts of the decoupling intervention are successful. This would involve training entrepreneurs to manage the enterprises, workers to operate the machines, service providers to service the enterprises, masons to use the products and consumers to accept it.
- *Easy access to finance* to accelerate the uptake of such cleaner technology options (often a barrier to implementation for such enterprises). Innovative tools and mechanisms and financial inclusion for micro, small and medium enterprises will go a long way in providing a push to the sector.
- *Behaviour change* by creating awareness among individuals, institutional users and policy makers at the regulatory level to ensure the transition towards sustainable consumption pattern.

[39] Overseas Development Institute (2013) *The Green Building Case Study*

- *An enabling policy environment* will provide a push factor, while market and demand creation will orchestrate a pull factor, thus promoting the sustainable production and consumption intervention initiated. These can include policies for preferential procurement and incentivising resource efficiency etc.

Next Steps

One of greatest lessons from the Millennium Development Goals and processes is that when there are globally agreed goals there is concerted efforts towards achieving them. The recent dialogue on Post - 2015 processes offers an opportunity towards integration of efficient and sustainable utilisation of our resources via decoupling across the board. While decoupling can lead the way towards human-wellbeing, there are many steps along the way.

Moving forward in this transition requires research based political consultancy for the three key sectors listed above. The research outputs must adopt a framework that analyses the role of each driver in promoting sustainable resource management along the critical resources identified with a nexus approach. In other words, it needs to create policy coherence such that the development pathways embrace inter-linkages. These research outputs must highlight best practices from across the globe to strengthen the case.

Some key questions that need to be addressed are:

- What are the key resource management strategies for countries? What implications do these have on India and Germany?
- What lessons do the highlighted best practices provide us with respect to the treatment and management of interdependent resources (nexus)?
- What structural measures are suitable to stop or even to invert the counter-productive (rebound effect) decoupling of GDP growth and life satisfaction?
- How do we embed equity and social justice with respect to access to natural resources while moving towards decoupling?
- What is the role of the key stakeholders for each of the drivers of action?