

Is green growth relevant for poor economies?

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**3rd International Conference: Environment and Natural
Resources Management in Developing and Transition
Economies, Clermont Ferrand, France, 8-10 October 2014**

Outline

- The conceptual framework of green growth.
- What are the key policy tradeoffs implied by green growth?
- Is green growth good for the poor?
- Are climate mitigation policies good for the poor?
- Can green growth be reconciled with the key structural features of natural resource use and poverty in poor economies?
- Can low and middle income economies rich with natural resources grow fast and in a sustainable way?
- A policy strategy for green growth in poor economies.

What is green growth?

- A typical definition is that “green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.”

Organization for Economic Cooperation and Development (OECD). 2011. *Towards Green Growth*. OECD, Paris, p. 9.

- Income growth, employment and poverty alleviation should be driven by investments that:
 - Reduce carbon emissions and pollution
 - Enhance energy and resource efficiency
 - Prevent the loss of biodiversity and ecosystem services.

UNEP. 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. UN Environment Programme, Geneva and Nairobi.

The green growth narrative: four perspectives

- *Keynesian perspective* – mitigate short-term macroeconomic fluctuations, unemployment, fiscal sustainability and global imbalances.
- *Pigouvian perspective* – implement market-based instruments, regulations, subsidy removal, etc. to “internalize” environmental externalities.
- *Schumpeterian perspective* – innovation and R&D to foster new “green” industries, technological change and development.
- *Georgian perspective* – mitigate resource scarcity, through substituting away from scarce resources such as fossil fuels might remove a constraint to long-term growth.

Bowen, A. and Frankhauser, S. 2012. “The green growth narrative: Paradigm shift or just spin?”
Global Environmental Change 21:1157-11159

Macroeconomic vs environmental goals

Program	Type of effect			
	Short-term stimulus	Long-term growth	Greenhouse gas reductions	Environmental improvement
Energy efficiency retrofits	High	Medium	Medium	Medium
Energy efficiency improvements in new capital	Low/Medium	Low/Medium	High	Medium/High
Green transport infrastructure	Low/Medium	Low	Medium/High	Medium/High
Cash for clunkers	Medium	Low	Low	Low/Medium
Power grid expansion	Low	Medium/High	Low/Medium	Variable

Strand, J. and M. Toman. 2010. "'Green Stimulus', Economy Recovery, and Long-Term Sustainable Development." Policy Research Working Paper 5163. The World Bank, Washington DC.

Policies and tradeoffs

		Local and immediate benefits versus global and long-term benefits		
		Fewer trade-offs	Some trade-offs	More trade-offs
Political difficulty of implementation	Easy	Energy conservation Land-use planning	Improved drinking water and sanitation Development of fuel-efficient vehicles	Carbon sequestration projects
	Moderate	Public urban transportation	Low-cost clean energy supply Removal of fossil fuel subsidies Subsidies for clean energy R&D	Ocean conservation and fisheries management International payment for ecosystem services Large-scale water management projects
	Hard	Pollution regulation and pricing	Natural resource management and pricing Sustainable intensification of agriculture Water pricing Removal of water subsidies Carbon pricing	Global carbon tax High-cost clean energy supply Removal of agricultural subsidies

Schematic ranking of select green growth policies. The ranking reflects the political difficulty of implementation and trade-offs between local and immediate versus more global and long-term benefits. [Based on (2–5)]

Barbier, E.B. 2012. "The Green Economy Post Rio+20." *Science* 338:887-888.

Green growth vs. growth

- Growth in conventionally measured output or GDP may not necessarily increase as a result of “green” policies.
- Environmental regulation could reduce conventionally measured output growth, if other growth-benefitting efficiency gains or technology changes are discouraged or not possible.
- Any shift from growth to green growth will have distributional implications.
- It will be important to identify those policies that will favor or hurt the poor, even if overall they increase economic output or welfare.

Hallegatte, S., G. Heal, M. Fay and D. Treguer. 2011. “From Growth to Green Growth”, Policy Research Working Paper WPS 5872, The World Bank, Washington, D.C., November.

Is green growth good for the poor?

- *Environmental pricing and regulation*
 - May negatively impact the poor as consumers, and would require specific social protection measures to compensate for price rises
 - May negatively affect the poor as producers, as they may not have sufficient access to the wealth nor human capital required to substitute for more expensive energy or other natural resources.
 - May promote rent capture by the rich.
- *Low carbon and environmentally sensitive investments*
 - More technology and capital intensive growth is unlikely to favor the poor.
 - Public “green” subsidies and investment may crowd out pro-poor programs (health care, education, agricultural R&D).

Dercon, S. 2012. “Is green growth good for the poor?”. Policy Research Working Paper WPS 6231, The World Bank, Washington, D.C., October.

Green growth and rural poverty

- If green growth is to have relevance for developing economies, it must also be compatible with the most important development objective, which is poverty alleviation.
- In developing economies many of the rural poor – who are growing in number – are increasingly concentrated in less favored lands and remote areas.
- This particular structural feature of underdevelopment remains a paramount obstacle to any transition to sustained economic growth – green or otherwise – for much of the developing world.
- Requires a new strategy for overcoming the pervasive problem of ecological scarcity and poverty in many rural areas of developing economies.

Barbier, E.B. 2012. “Natural capital, ecological scarcity and rural poverty”. Policy Research Working Paper WPS 6232, The World Bank, Washington, D.C., October.

Are climate mitigation policies good for the poor?

- Mitigation policies comprise all human interventions aimed at reducing the emissions or enhancing the sinks of greenhouse gases (GHG), such as carbon dioxide, methane and nitrous oxide.
- **Direct impacts on poverty** include payments for avoided deforestation, changes in air quality and any resulting health effects, and energy, agricultural and transport innovations.
- However, other mitigation policies may influence the trade and economic growth of developing countries, which in turn can **indirectly impact the poor** via output markets (e.g. agricultural commodities, imported goods or consumption) or factor earnings (wages or land rents).
- These effects can be both negative and positive.
- Need for a more comprehensive approach to analyzing how mitigation policies affect the poor in developing countries, especially assessing the potential trade-offs between the positive and negative impacts on poverty alleviation.

Barbier, E.B. 2014. "Climate change mitigation policies and poverty." *WIREs Climate Change* 5:483-491 doi: 10.1002/wcc.281.

Reduced GHG emissions and health co-benefits

Mitigation strategy	Location	Health mechanism	Health problems avoided	Disease reduction (DALY)	Cost (US\$)	Adverse health effect
Clean-burning cook stove	India	Reduces exposure to indoor pollution	Acute lower respiratory tract infection, heart disease, respiratory disease	12,500	\$50 per stove, although household benefits from fuel and time saving	None identified
Low carbon and more active transport	Delhi, India	Reduces air pollution and injury risk; more physical activity	Heart disease, road traffic injuries, cerebrovascular disease, lung cancer, diabetes, depression	13,000	Unclear, although possible cost-saving for some households	Increased exposure to traffic danger from more walking and cycling
Lowering consumption of animal products	São Paulo, Brazil	Lower saturated fat intake	Heart disease	2,200	Unclear, possible cost-saving for some households	Less childhood growth and development from reduced animal-product consumption
Low carbon electricity generation	China, India	Reduced air pollution	Cardiopulmonary mortality, lung cancer, occupational mortality	550 (China) 1,500 (India)	\$70 per tonne CO ₂ (China) \$40 per tonne CO ₂ (India)	Increase in energy poverty from higher electricity costs, health risks from nuclear generation and carbon capture and storage

DALY = Disability-adjusted life year saved.

Source: Haines, A, McMichael AJ, Smith KR, Roberts J, Woodcock J, Markandya A, Armstrong BG, Campbell-Lendrum D, Dangour AD, Davies M, *et al.* Public health benefits of strategies to reduce greenhouse-gas emissions: overview and implications for policy makers. *Lancet* 2009, 374:2104-2114. DOI:10.1016/S0140-6736(09)61759-1

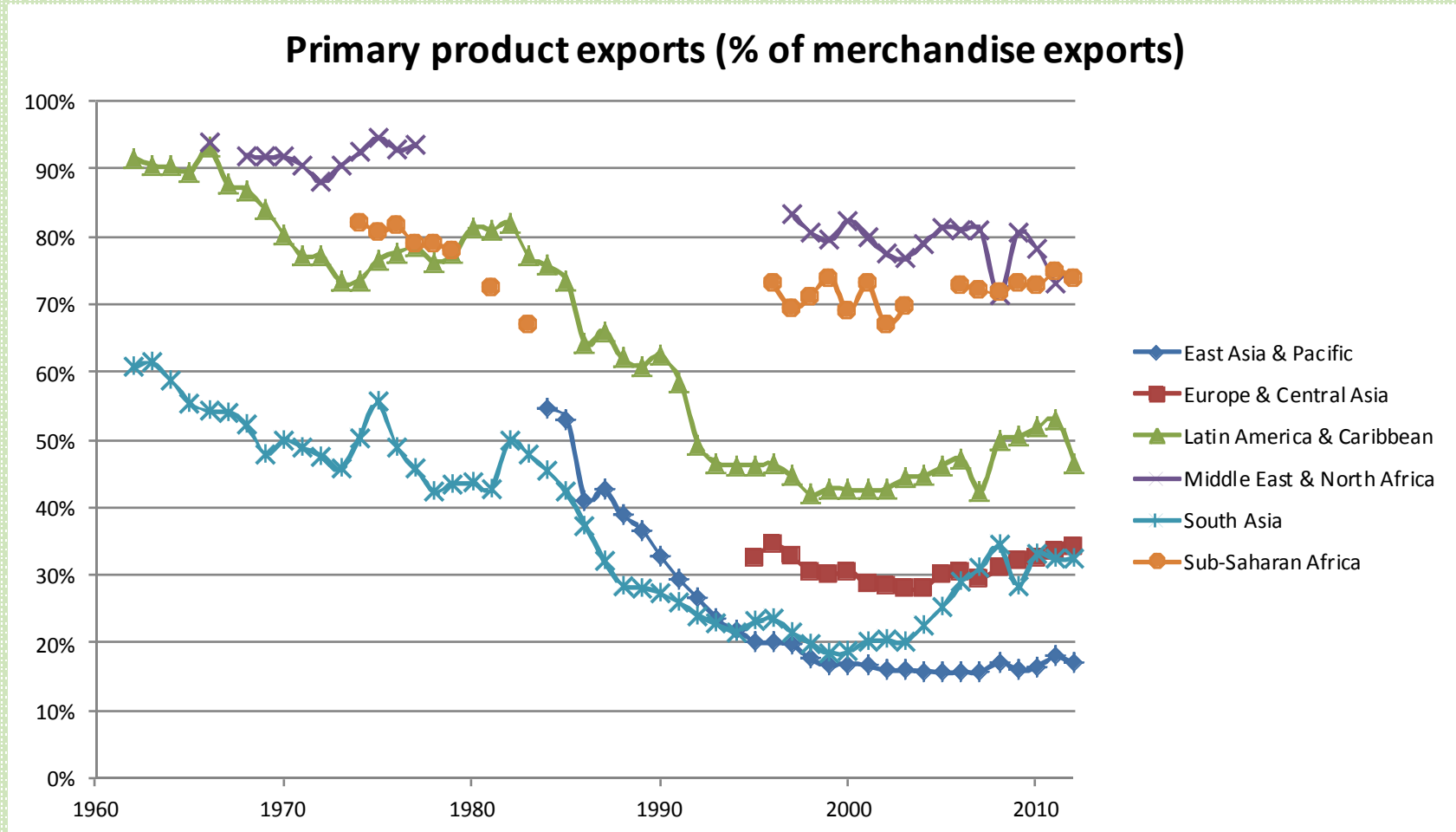
Two key stylized facts of NR use and poverty

- The structural features of natural resource use and poverty in developing countries underlie two “stylized facts” in most developing countries.
- SF#1: Many economies are resource-dependent and thus highly reliant on a commercial primary products sector.
- SF#1: Many economies have a “residual” pool of rural poor located on abundant but less favored (marginal) agricultural land and in remote areas.
- If green growth strategies are to be successful in poor economies, they must be reconciled with these two stylized facts.

SF#1: Resource dependency and commercial primary production

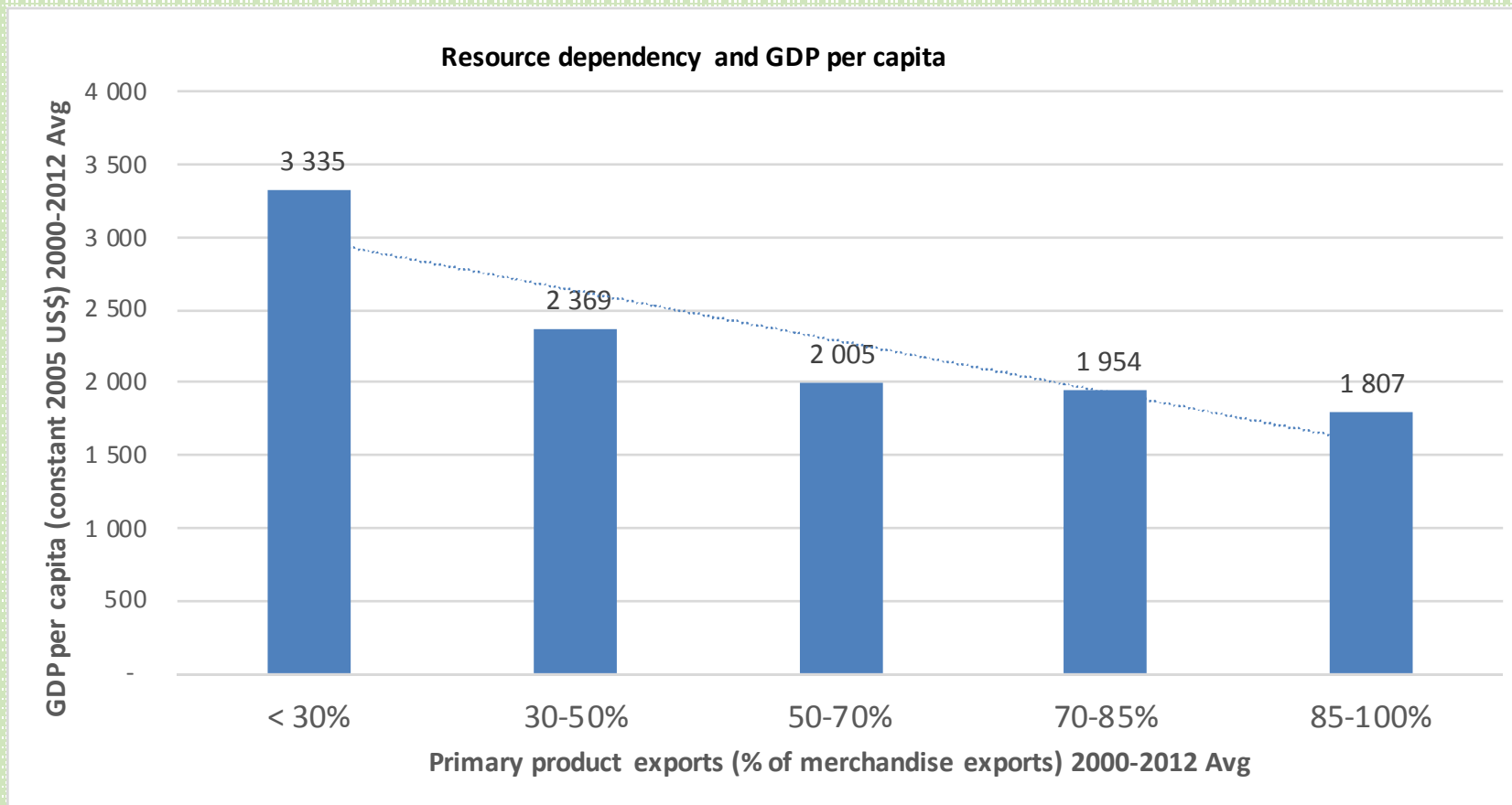
- Increasingly commercially oriented economic activities are responsible for much of the resource exploitation and agricultural expansion in developing countries (Boucher et al. 2011; Chomitz et al 2007; Deininger et al. 2011; DeFries et al. 2010; FAO 2006; Rudel 2007).
- Includes LS & plantation agriculture, ranching, forestry and mining.
- Often result in export-oriented extractive enclaves with little or no forward and backward linkages (Barbier 2005 and 2011; Bridge 2008; van der Ploeg 2011).
- Actively promoted to expand the primary products sector, especially in the land and resource abundant regions of Latin America and Africa (Deininger and Bayerlee 2012; Rudel 2007).
- **Result:** Many developing economies remain highly dependent on the exploitation of natural resources and are unable to diversify from primary production.

Resource dependency in developing country regions



Primary product export share is the percentage of agricultural raw material, food, fuel, ore and metal commodities to total merchandise exports, from World Bank *World Development Indicators* (2014).

Resource dependency and GDP per capita, 2000-2012



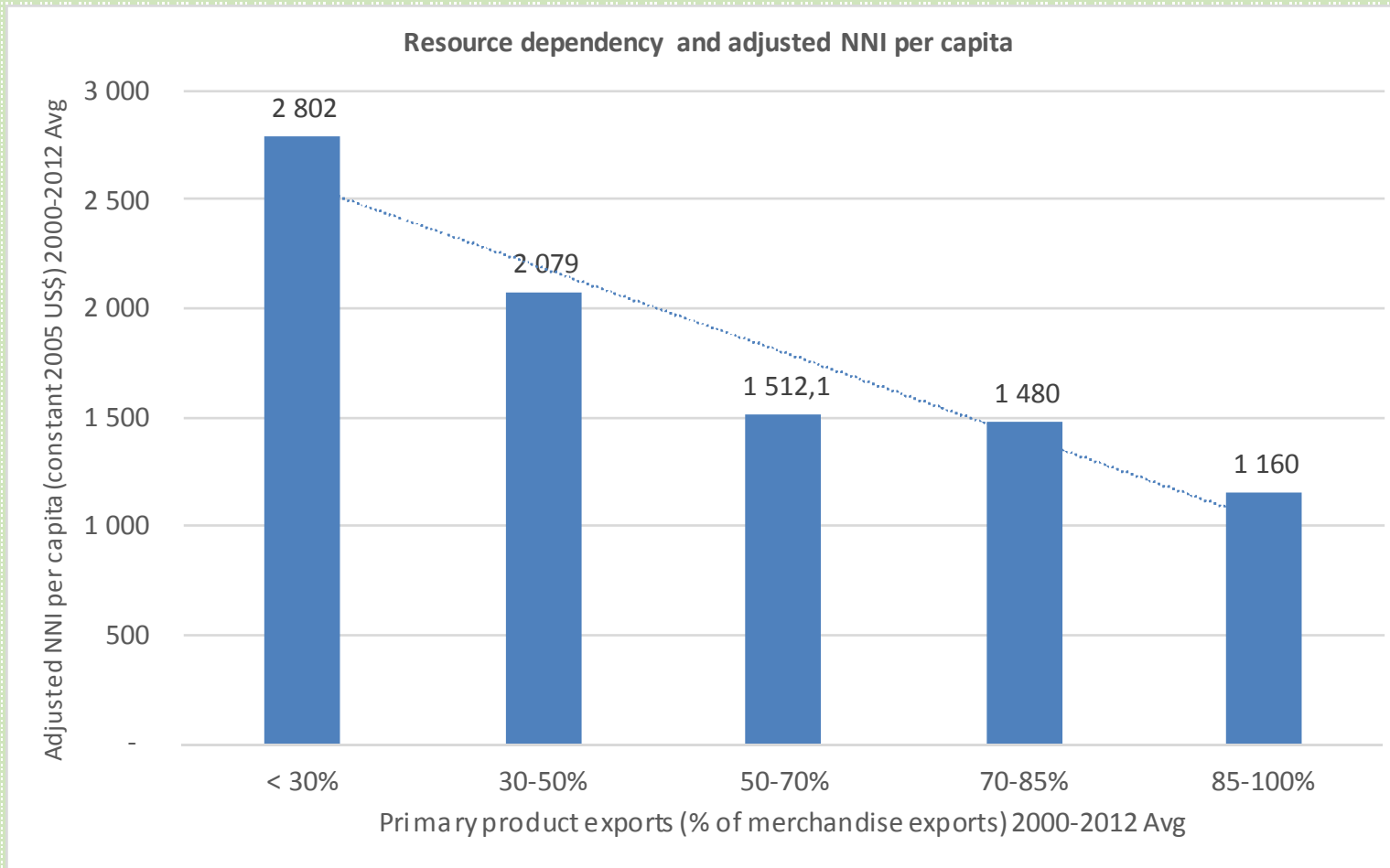
118 countries, of which 27 (< 30%), 20 (30-50%), 20 (50-70%), 26 (70-85%) and 25 (85-100%).

Primary product export share is the percentage of agricultural raw material, food, fuel, ore and metal commodities to total merchandise exports (average 58.8%, median 64.0%). GDP per capita is gross domestic product divided by midyear population (average \$2,323, median \$1,557).

Low and middle-income (or developing) countries are economies with 2013 per capita income of \$12,745 or less.

Source: World Bank, World Development Indicators, available from <http://databank.worldbank.org/data>

Resource dependency and ANNI per capita, 2000-2012



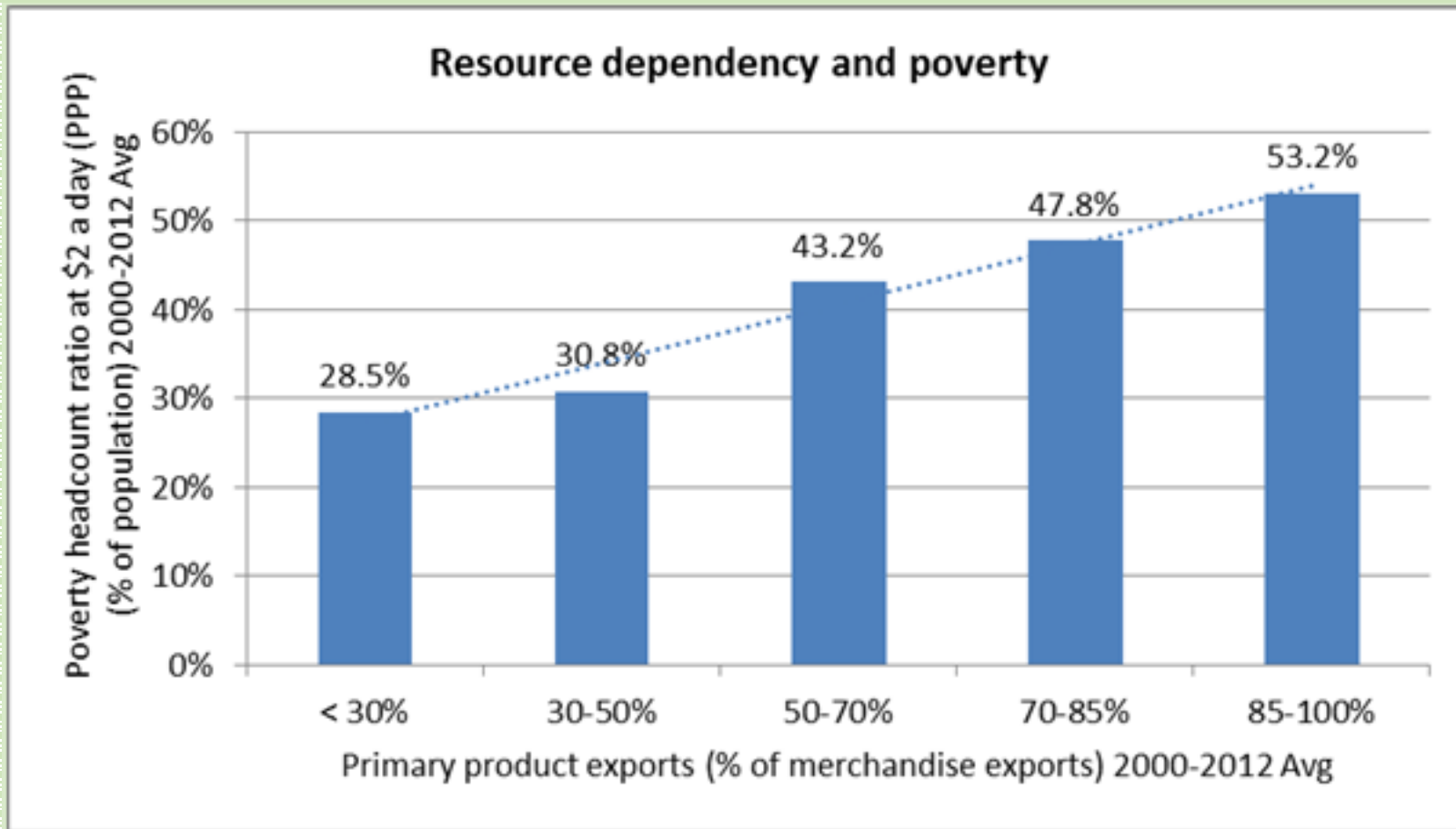
114 countries, of which 26 (< 30%), 19 (30-50%), 19 (50-70%), 26 (70-85%) and 24 (85-100%).

Primary product export share is the percentage of agricultural raw material, food, fuel, ore and metal commodities to total merchandise exports (average 58.9%, median 64.0%). Adjusted net national income (NNI) is gross national income (GNI) minus consumption of fixed capital and natural resources depletion (average \$1,819, median \$1,245).

Low and middle-income (or developing) countries are economies with 2013 per capita income of \$12,745 or less.

Source: World Bank, World Development Indicators, available from <http://databank.worldbank.org/data>

Resource dependency and poverty, 2000-2012



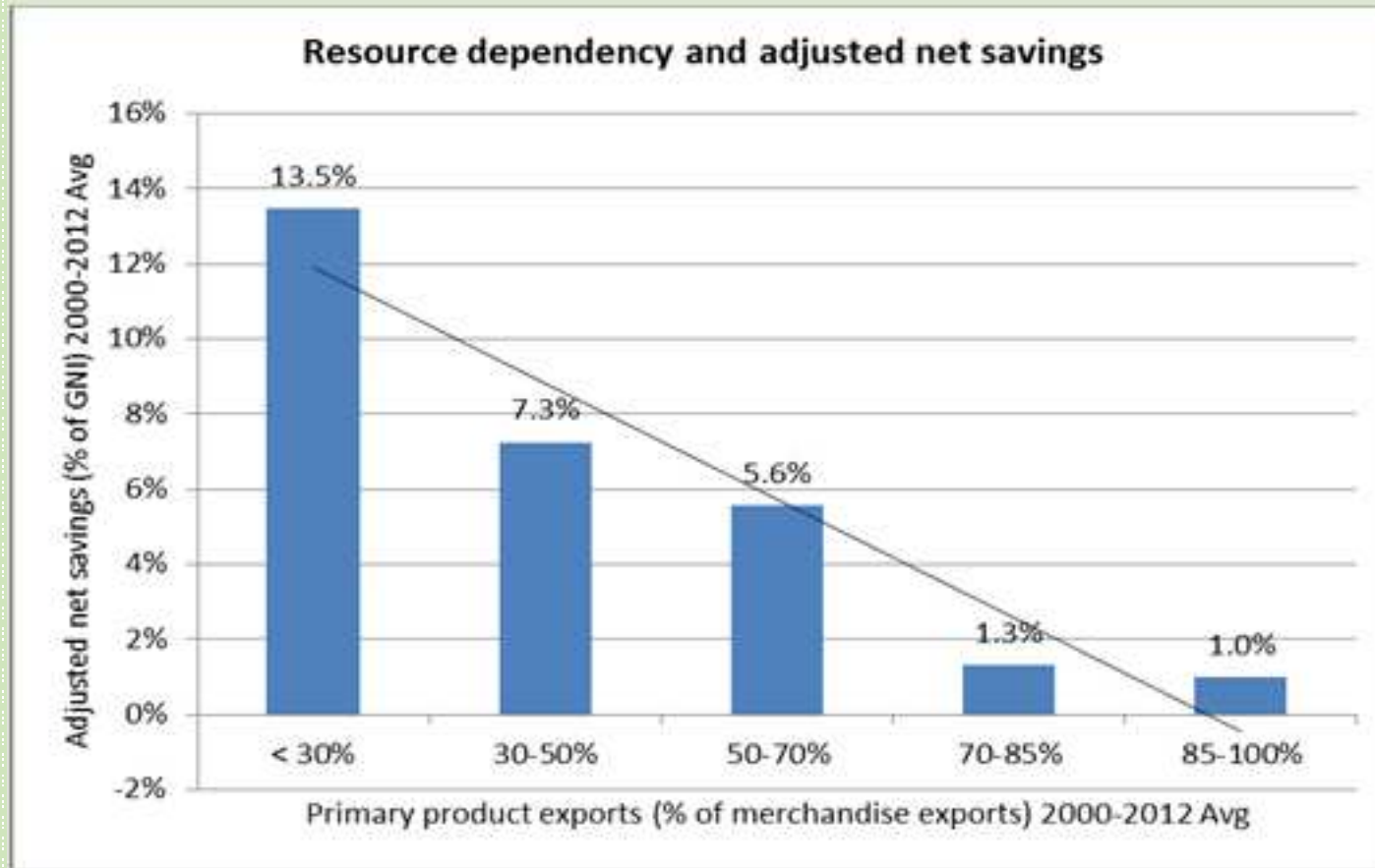
101 countries, of which 24 (< 30%), 18 (30-50%), 18 (50-70%), 20 (70-85%) and 21 (85-100%).

Primary product export share is the percentage of agricultural raw material, food, fuel, ore and metal commodities to total merchandise exports (average 57.7%, median 58.6%). Population below \$2 a day is the percentage of the population living on less than \$2.00 a day at 2005 international purchase power parity (PPP) prices. For eight countries, the poverty headcount ratio is at national poverty line (% of population). Across all countries, the average poverty rate was 40.5%, and the median 35.5%.

Low and middle-income (or developing) countries are economies with 2013 per capita income of \$12,745 or less.

Source: World Bank, World Development Indicators, available from <http://databank.worldbank.org/data>

Resource dependency and adjusted net savings, 2000-2012



100 countries, of which 24 (< 30%), 15 (30-50%), 17 (50-70%), 22 (70-85%) and 22 (85-100%).

Primary product export share is the percentage of agricultural raw material, food, fuel, ore and metal commodities to total merchandise exports (average 58.7%, median 63.8%).

Adjusted net savings are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion and net forest depletion, and is expressed as the share (%) of gross national income (GNI). Average 5.8%, median 6.1%.

Low and middle-income (or developing) countries are economies with 2013 per capita income of \$12,745 or less.

Source: World Bank, World Development Indicators, available from <http://databank.worldbank.org/data>

SF#2: Marginal land expansion and the rural poor

- Since 1950, the estimated population in developing economies on “ecologically fragile lands” has doubled; today nearly 1.3 billion people – almost one quarter of the world’s population in 2000 – live in such areas (World Bank 2003).
- Well over 600 million of the rural poor currently live on lands prone to degradation and water stress, and in upland areas, forest systems and drylands that are vulnerable to climatic and ecological disruptions (Comprehensive Assessment of Water Management in Agriculture 2007).
- Around three-quarters of the developing world’s poor still live in rural areas, and twice as many poor people live in rural than in urban areas (Chen and Ravallion 2007).
- By 2025, the rural population of the developing world will have increased to almost 3.2 billion, placing increasing pressure on a declining resource base

Classification of less favored agricultural lands and areas

Edward B. Barbier and Jacob P. Hochard, 2014. "Land Degradation, Less Favored Lands and the Rural Poor: A Spatial and Economic Analysis." A Report for the Economics of Land Degradation Initiative. Department of Economics and Finance, University of Wyoming.
Available from: www.eld-initiative.org

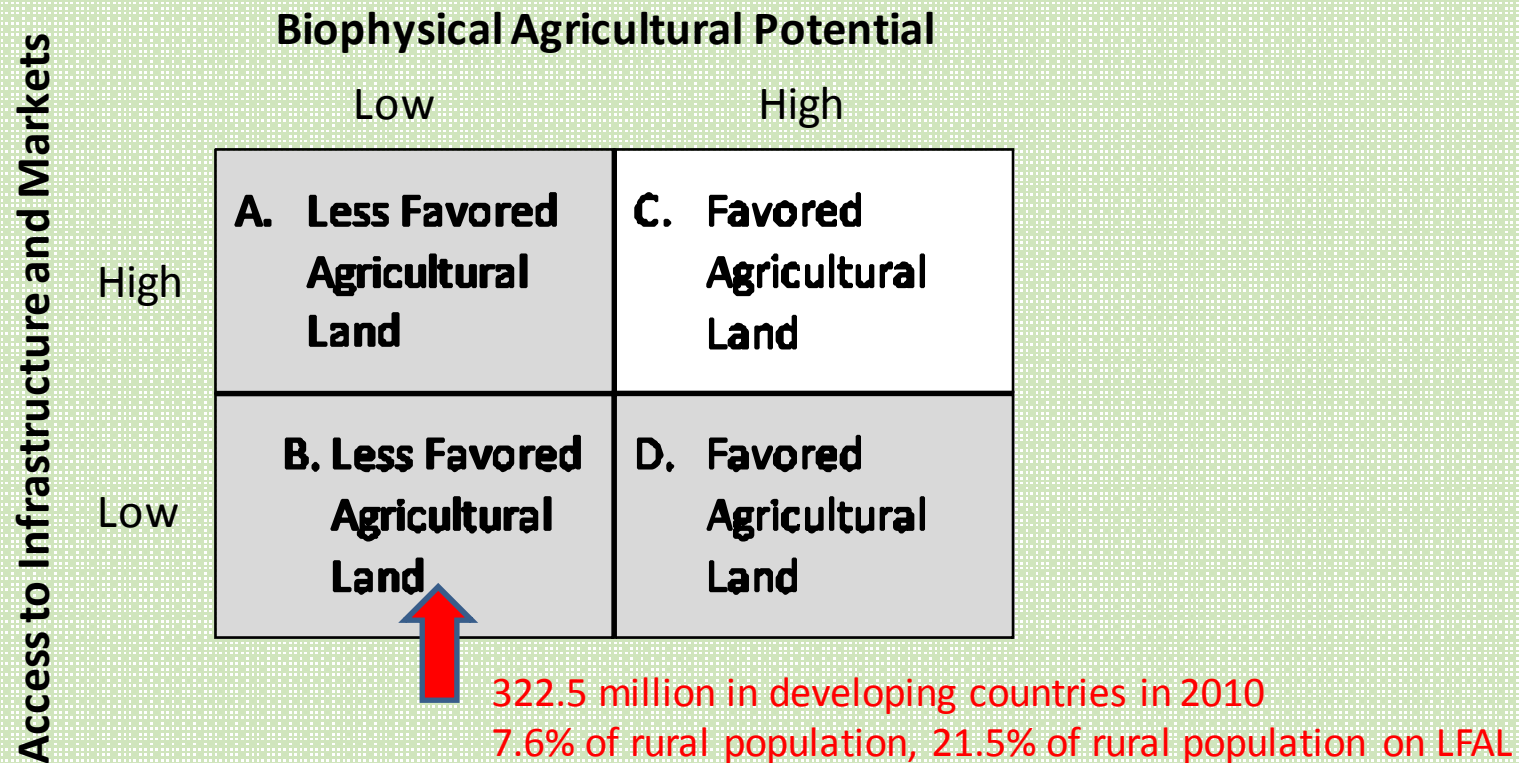
		Biophysical Agricultural Potential	
		Low	High
Access to Infrastructure and Markets	High	A. Less Favored Agricultural Land	C. Favored Agricultural Land
	Low	B. Less Favored Agricultural Land	D. Favored Agricultural Land

Less favored agricultural land (A and B) has low agricultural potential as it is constrained biophysically by terrain, poor soil quality or limited rainfall. *Less favored agricultural areas* (shaded gray) also include favored agricultural land that is remote due to poor access to infrastructure and markets (D).

Source: Based on the definition and classification of less favored areas in Pender and Hazell (2000).

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Source: Based on the definition and classification of less favored areas in Pender and Hazell (2000).

Rural Population on LFAL and LFAA, 2000

	Population in 2000 (millions)				
	Rural population (1)	Rural population on less favored agricultural land (LFAL) (2)	% share (2)/(1)	Rural population in less favored agricultural areas (LFAA) (3)	% share (3)/(1)
Developing country	3,706.8	1,314.5	35.5%	1,382.7	37.3%
East Asia & Pacific	1,398.4	645.0	46.1%	672.9	48.1%
Europe & C. Asia	173.8	96.4	55.5%	97.1	55.9%
Latin America & Caribbean	294.1	94.9	32.3%	97.0	33.0%
Middle East & N. Africa	195.6	44.9	23.0%	45.2	23.1%
South Asia	1,090.4	269.0	24.7%	291.0	26.7%
Sub-Saharan Africa	554.6	164.3	29.6%	179.5	32.4%
Developed country	404.7	171.8	42.4%	173.8	42.9%
World	4,111.5	1,486.3	36.1%	1,556.4	37.9%

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Rural Population on Remote LFAL, 2000

	Population in 2000 (millions)		
	Rural population on remote less favored agricultural land (LFAL)	% share of rural population	% share of rural population on LFAL
Developing country	288.2	7.8%	21.9%
East Asia & Pacific	164.7	11.8%	25.5%
Europe & C. Asia	12.0	6.9%	12.4%
Latin America & Caribbean	12.8	4.3%	13.5%
Middle East & N. Africa	6.8	3.5%	15.1%
South Asia	42.6	3.9%	15.8%
Sub-Saharan Africa	49.3	8.9%	30.0%
Developed country	10.2	2.5%	6.0%
World	298.4	7.3%	20.1%

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Rural Population on LFAL and LFAA, 2000-2010 change

	Percentage (%) change from 2000 to 2010			
	Rural population (1)	Rural population on less favored agricultural land (LFAL) (2)	Rural population in less favored agricultural areas (LFAA) (3)	Rural population on remote less favored agricultural land (LFAL) (4)
Developing country	14.6%	14.1%	14.3%	11.4%
East Asia & Pacific	7.2%	10.0%	9.9%	5.1%
Europe & C. Asia	4.0%	1.4%	1.4%	3.3%
Latin America & Caribbean	14.3%	15.1%	15.2%	15.4%
Middle East & N. Africa	21.3%	12.3%	12.4%	5.6%
South Asia	17.8%	15.1%	15.2%	16.6%
Sub-Saharan Africa	28.3%	35.9%	35.8%	32.9%
Developed country	2.6%	-2.9%	-2.9%	-3.1%
World	13.4%	12.1%	12.3%	11.9%

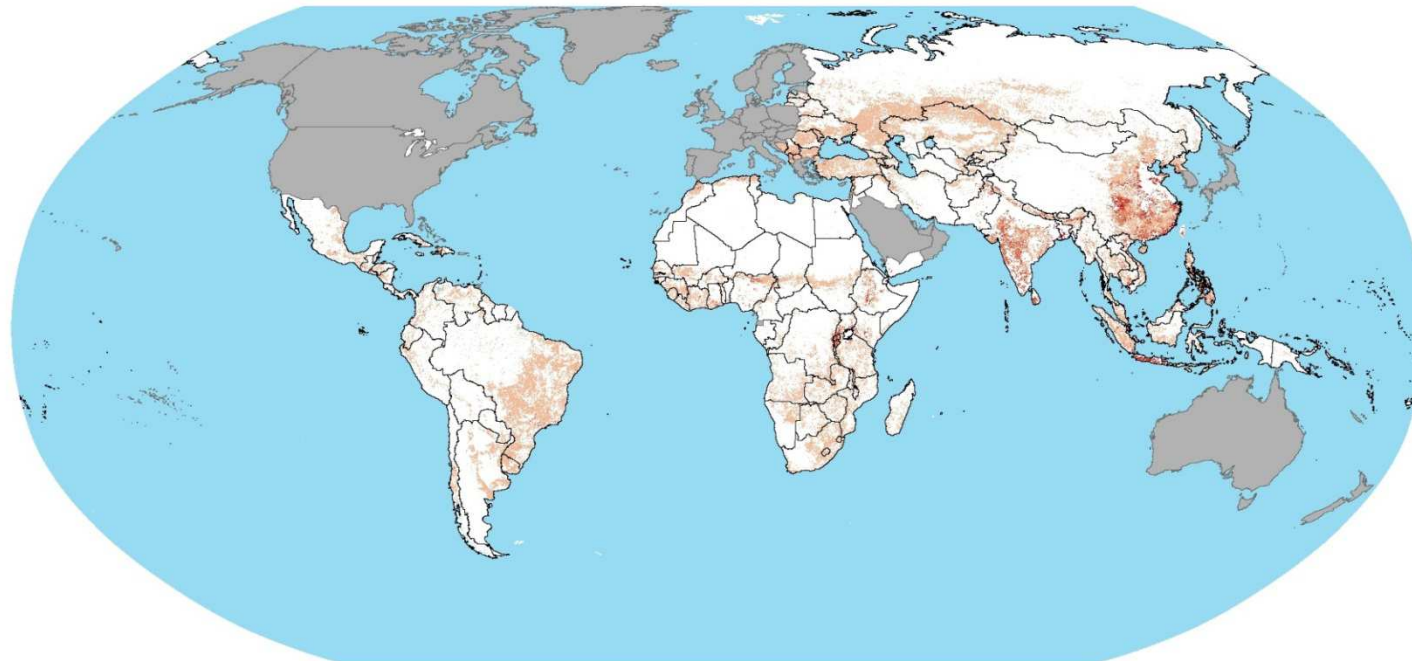
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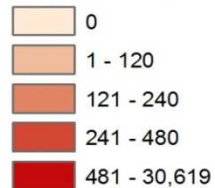
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Rural population on less favorable agricultural lands (2010):
All developing countries



**Less favorable agricultural land
Population per sq km**



Less favored agricultural land (LFAL) consists of irrigated land on terrain greater than 8% median slope; rainfed land with a length of growing period (LGP) of more than 120 days but either on terrain greater than 8% media slope or with poor soil quality; semi-arid land (land with LGP 60-119 days); and arid land (land with LGP <60 days).

Developing countries are all low and middle-income economies with 2012 per capita income of \$12,615 or less (World Bank 2014).

Edward B. Barbier and Jacob P. Hochard, 2014. "Land Degradation, Less Favored Lands and the Rural Poor: A Spatial and Economic Analysis." A Report for the Economics of Land Degradation Initiative. Department of Economics and Finance, University of Wyoming. Available from: www.eld-initiative.org

Rural population on less favorable agricultural lands (2010): Sub-Saharan African developing countries

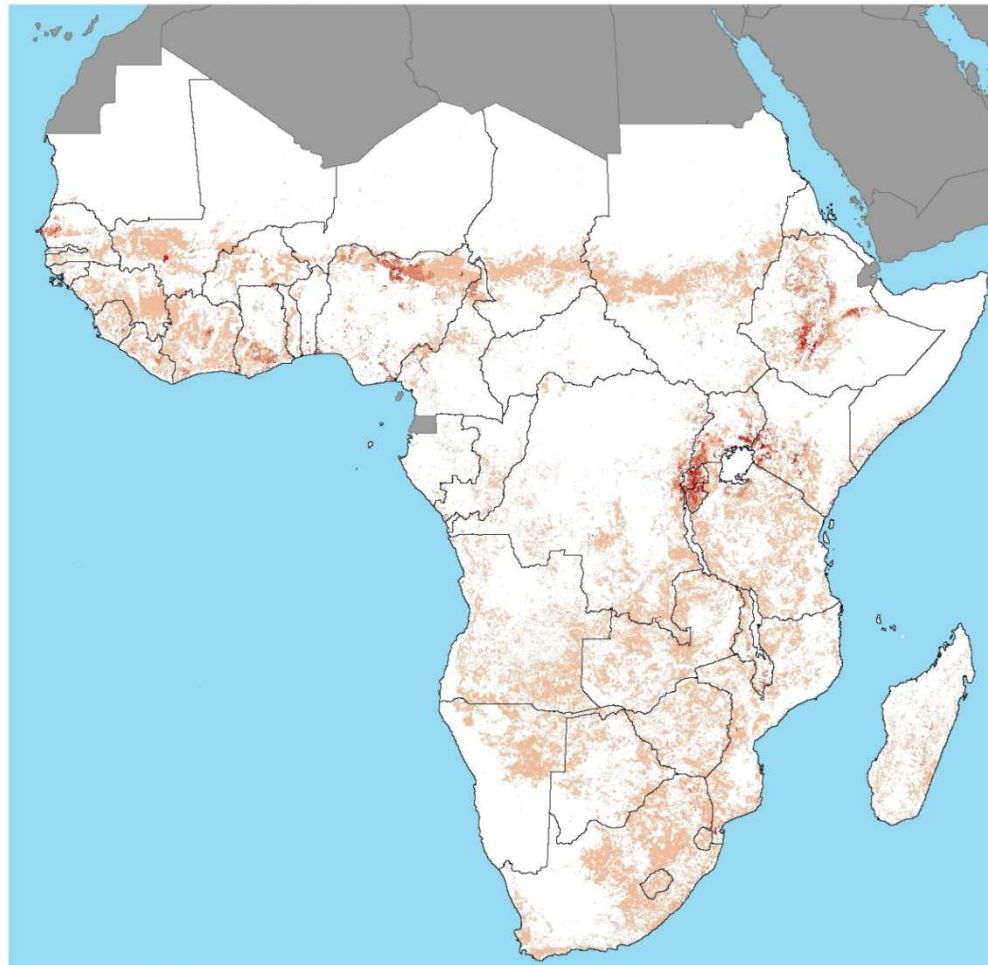
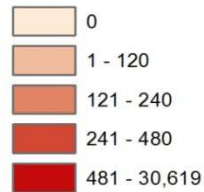
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Legend

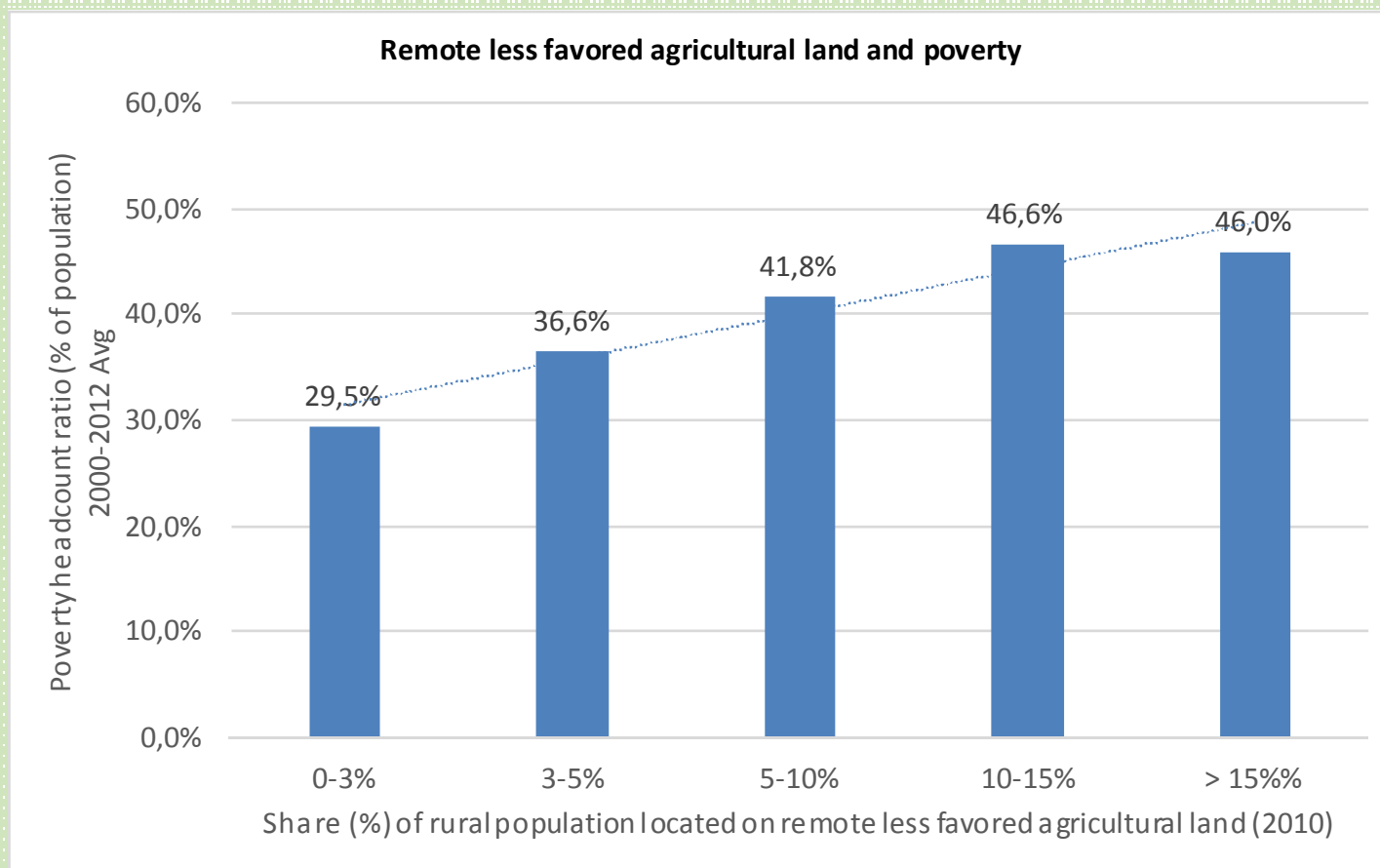
Less favorable agricultural land

Population per sq km



Edward B. Barbier and Jacob P. Hochard, 2014. "Land Degradation, Less Favored Lands and the Rural Poor: A Spatial and Economic Analysis." A Report for the Economics of Land Degradation Initiative. Department of Economics and Finance, University of Wyoming. Available from: www.eld-initiative.org

Rural population on remote LFAL and poverty



98 countries, of which 18 (0-3%), 20 (3-5%), 28 (5-10%), 20 (10-15%) and 13 (> 15%).

Share (%) of rural population located on remote less favored agricultural land (average 8.8%, median 6.9%). Population below \$2 a day is the percentage of the population living on less than \$2.00 a day at 2005 international purchase power parity (PPP) prices. For eight countries, the poverty headcount ratio is at national poverty line (% of population). Across all countries, the average poverty rate was 40.9%, and the median 35.4%.

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Source: World Bank, World Development Indicators, available from <http://databank.worldbank.org/data> and Barbier and Hochard. 2014, op. cit.

Poverty analysis: Key findings

- Our poverty analysis examines whether the spatial distribution of rural populations in developing countries on LFAL, LFAA and remote LFAL in 2000 affects poverty rate from 2000-2012.
- No evidence of a direct impact on poverty changes from 2000-2012.
- But there is a significant indirect impact through lowering the poverty-reducing impact of income growth over 2000-2012.
- Across a wide range of developing countries, as more rural people are located on remote and less-favored agricultural land, the result is a substantial attenuation of the poverty-reducing impact of growth.

Edward B. Barbier and Jacob P. Hochard, 2014. "Land Degradation, Less Favored Lands and the Rural Poor: A Spatial and Economic Analysis." A Report for the Economics of Land Degradation Initiative. Department of Economics and Finance, University of Wyoming. Available from: www.eld-initiative.org

Poverty analysis: impacts

	Initial level	Final level	per cent change in poverty rate per year
Share (%) of rural population on less favoured agricultural land (LFAL)	38.15 %	59.10 %	0.92 % to 0.99 %
Share (%) of rural population in less favoured agricultural areas (LFAA)	40.04 %	60.83 %	0.97 % to 1.11 %
Share (%) of rural population located on remote LFAL	8.50 %	16.90 %	0.35 % to 0.47 %
Share (%) of rural population on LFAL located on remote LFAL	24.74 %	43.55 %	0.95 % to 1.32 %

The initial level is based on the mean and the final level on a one-standard-deviation change in the relevant variables listed in the far-left column for the sample of 83 developing countries.

Source: Edward B. Barbier and Jacob P. Hochard, 2014. "Land Degradation, Less Favored Lands and the Rural Poor: A Spatial and Economic Analysis." A Report for the Economics of Land Degradation Initiative. Department of Economics and Finance, University of Wyoming.

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Summary of key structural features

	GDP per capita (constant 2005 US\$) 2000-2012 Avg	Poverty headcount ratio (% of population) 2000-2012 Avg	Primary product exports (% of merchandise exports) 2000-2012 Avg	Share (%) of rural population located on remote less favored agricultural land 2010
Low income	537	64.1%	66.6%	10.2%
Lower middle income	2,409	23.4%	53.5%	7.8%
Upper middle income	6,101	15.3%	43.7%	6.7%
All developing	2,077	40.9%	58.1%	8.8%

98 countries, of which 45 are low income, 39 are lower middle income and 14 are upper middle income.

Low-income economies are those in which 2013 GNI per capita was \$1,045 or less. Lower-middle-income economies are those in which 2013 GNI per capita was between \$1,046 and \$4,125. Upper-middle-income economies are those in which 2013 GNI per capita was between \$4,126 and \$12,745.

Source: World Bank, World Development Indicators, available from <http://databank.worldbank.org/data> and Barbier and Hochard. 2014, op. cit.

Implications for green growth

- The emphasis on structural transformation of developing economies endorses policies that promote growth of industries and highly commercialized agricultural and service activities.
- Structural transformation of developing economics – “green” or otherwise – is unlikely to benefit the rural poor on less favored lands and in remote areas.
- It is also unlikely to end the “enclavism” predominating in primary production and resource-based activities.
- Additional policies are required to address the two “stylized facts” associated with resource dependency and rural poverty:
 - SF#1: Improve the efficiency and sustainability of primary production for more economy-wide gains.
 - SF#2: Targeted policies for the rural poor on less favored lands and in remote areas.

Successful resource-based development

- Various examples of successful and sustainable resource-based development, from the late 19th century to the present, highlight the three key factors in this process:
- Resource-enhancing technological change in primary production activities.
- Strong forward and backward linkages between the resource-based primary production sector and the rest of the economy.
- Substantial knowledge spillovers in primary production and across resource-based activities.

Barbier, E.B. 2011. *Scarcity and Frontiers: How Economies Have Developed Through Natural Resource Exploitation*. Cambridge University Press, Cambridge and New York.

Resource-enhancing technological change

- Country-specific knowledge and technical applications in the resource extraction sector can effectively expand what appears to be a "fixed" resource endowment of a country.
- Wright and Czelusta (2004) document this process for several successful mineral-based economies over the past 30 to 40 years:
 - "From the standpoint of development policy, a crucial aspect of the process is the role of country-specific knowledge. Although the deep scientific bases for progress are undoubtedly global, it is in the nature of geology that location-specific knowledge continues to be important....the experience of the 1970s stands in marked contrast to the 1990s, when mineral production steadily expanded primarily as a result of purposeful exploration and ongoing advances in the technologies of search, extraction, refining, and utilization; in other words by a process of learning."

Wright, G. and J. Czelusta. 2004. "Why Economies Slow: The Myth of the Resource Curse." *Challenge* 47(2):6-38.

Backward and forward linkages

- There is a need to develop strong forward and backward linkages between the resource-based primary production sector and the rest of the economy.
- E.g., rapid industrial and economic expansion in the United States over 1879-1940 was strongly linked to the exploitation of abundant non-reproducible natural resources, particularly energy and minerals (Wright and Czelusta 2004; Wright 1990).
- Such linkages were also essential in promoting successful “staples-based” development in many economies during the 1870-1914 era (Findlay and Lundahl 1999):
 - “...not all resource-rich countries succeeded in spreading the growth impulses from their primary sectors....in a number of instances the staples sector turned out to be an enclave with little contact with the rest of the economy....The staples theory of growth stresses the development of linkages between the export sector and an incipient manufacturing sector.”

Findlay, Ronald and Mats Lundahl. 1999. “Resource-Led Growth – a Long-Term Perspective: The Relevance of the 1970-194 Experience for Today’s Developing Economies.” UNU/WIDER Working Papers No. 162. WIDER, Helsinki

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Knowledge spillovers

- There needs to be substantial knowledge spillovers arising from the extraction and use of resources and land in primary production and benefiting the wider economy.
- E.g., the rise of the American minerals-based economy from 1879 to 1940 can also be attributed to the infrastructure of public scientific knowledge, mining education and the "ethos of exploration" (David and Wright 1997).
- This in turn created knowledge spillovers across firms and "the components of successful modern-regimes of knowledge-based economic growth".
- There is evidence of this occurring in successful resource-based industries in some developing economies, such as Malaysia, Thailand, Brazil (Barbier 2011).

Targeted policies for marginal land agriculture

- As long as there remains significant numbers of the rural poor concentrated on less favored land in remote areas, rural poverty will remain a persistent constraint on development.
- Need for targeted policies to these households to raise real wages and alleviate widespread rural poverty:
 - Targeting investments and policies to improve the livelihoods and productivity of traditional agriculture on marginal land.
 - Appropriate targeting of research, extension and agricultural development to improve the livelihoods of the poor, increase employment opportunities and reduce environmental degradation.
 - Better market integration for the rural poor through developing public services and infrastructure in remote and ecologically fragile regions, such as extension services, roads, communications, protection of property, marketing services and other strategies to improve smallholder accessibility to larger markets.

Barbier, E.B. 2012. "Natural capital, ecological scarcity and rural poverty". Policy Research Working Paper WPS 6232, The World Bank, Washington, D.C., October.

Rural-urban migration

- Any policy strategy targeted at improving the livelihoods of the rural poor located in remote and fragile environments should be assessed against the alternative strategy of encouraging out-migration from these areas.
 - Rural development is costly.
 - Out-migration may occur anyway, and may be the less expensive option.
- Rarely are the two types of policy strategies, investment in poor rural areas and targeted outmigration, directly compared.
- Only recently have the linkages between rural out-migration, smallholder agriculture and land use change and degradation in remote and marginal areas been analyzed (Mendola 2008 and 2012; Gray 2009; Greiner and Sakdapolrak. 2012; VanWey et al. 2012).
- World Bank (2008, p. 49): “until migration provides alternative opportunities, the challenge is to improve the stability and resilience of livelihoods in these regions”.

Final remarks

- Green growth is relevant for poor economies only if it includes policies that are consistent with their key structural features of natural resource use and poverty .
- Such policies must foster forward and backward linkages of primary production, enhance its integration with the rest of the economy, and improve opportunities for innovation and knowledge spillovers.
- Rural poverty, especially the persistent concentration of the rural poor on less favored agricultural lands and in remote areas, needs to be addressed by additional targeted policies and investments.
- Policies to promote rural-urban migration should take into account the linkages with rural out-migration, smallholder agriculture and land use change, and degradation in remote and marginal areas.