

Consultative Group on International Agricultural Research
Science Forum
CGIAR Priorities: Science for the Poor

**POVERTY TRAPS AND AGRICULTURAL RESEARCH:
IMPROVING POLICIES, INSTITUTIONS AND TECHNOLOGIES TO
SUPPORT SUSTAINABLE POVERTY REDUCTION**

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Contemporary policy debates are rife with discussion of “poverty traps”.² Yet the term’s use typically lacks precision and the implications of possible poverty traps are not fully drawn out, particularly not as they relate to agricultural research, the mandate of the CGIAR. The twofold objective of this background brief is (i) to identify six key features of the poverty traps conceptualization of the challenge of sustainable poverty reduction, and (ii) to tease out some of the implications for international agricultural research. I frame these points by initial brief reference to two quite different African case studies. The central claim I make is that the poverty traps conceptualization appears appropriate for many CGIAR target populations and that it therefore has important implications for the design and implementation of CGIAR research.

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² See, for example, Jeffrey D. Sachs (2005), *The End of Poverty: Economic Possibilities For Our Time* (New York: Penguin Press), United Nations Millennium Project (2005), *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals*, (New York: United Nations Development Program), and Chronic Poverty Research Centre (2004), *Chronic Poverty Report 2004-5* (Manchester, UK: Chronic Poverty Research Centre).

Two Illustrative Case Studies

Let me very briefly illustrate the ideas that follow by reference to two very different environments in which my collaborators and I have been working for a decade or more.

The East Africa Rangelands³

Inhabitants of the arid and semi-arid rangelands of east Africa register some of the most acute poverty and suffer some of the most severe natural and manmade shocks of any peoples on the planet. Recent research has documented the apparent existence of poverty traps among the predominantly livestock-keeping populations of this region. These appear to arise largely due to the absence of viable non-livestock investments, highly variable livestock productivity due to climate fluctuations with limited reliable access to water and forage, and markets plagued by rudimentary physical and institutional infrastructure. Those who acquire and maintain large herds can maintain this wealth through seasonal migration, exploiting the spatiotemporal variability in forage and water availability to sustain the milk production and production of marketable animals on which their incomes disproportionately depend. In some cases this livestock wealth is built up and sustained in part through nonpastoral earnings through salaried labor, trading and other diversified livelihoods. Not all those with big herds are dedicated herders themselves. By contrast, those who collapse to a small herd size due to raids, disease or drought lose their mobility and thus their ability to grow or to sustain a large herd. They turn to unskilled labor, petty trade, high-risk rainfed crop cultivation, and similar demanding, low-return livelihood strategies to ~~ke~~ ^{make} out an existence, commonly settling in or around towns and depending occasionally on relief rations. These subpopulations find themselves in a poverty trap.

Sustainable poverty reduction in this setting depends fundamentally on research, not least of which to improve policies and institutions. Beyond obvious biophysical

³ See Travis J. Lybbert, Christopher B. Barrett, Solomon Desta, and D. Layne Coppock, "Stochastic Wealth Dynamics and Risk Management Among A Poor Population," *Economic Journal*, vol. 114, no. 498 (October 2004): pp. 750-777, Christopher B. Barrett, Paswel Phiri Marenja, John G. McPeak, Bart Minten, Festus M. Murithi, Willis Oluoch-Kosura, Frank Place, Jean Claude Randrianarisoa, Jhon Rasambainarivo and Justine Wangila, "Welfare Dynamics in Rural Kenya and Madagascar," *Journal of Development Studies* (forthcoming), and Christopher B. Barrett and John G. McPeak, "Poverty Traps and Safety Nets," in Alain de Janvry and Ravi Kanbur, editors, *Poverty, Inequality and Development: Essays in Honor of Erik Thorbecke* (Amsterdam: Kluwer, forthcoming), Paulo Santos and Christopher B. Barrett, "Safety nets or social insurance in the presence of poverty traps? Evidence from southern Ethiopia", May 2005 Cornell University working paper, Christopher B. Barrett and Winnie K. Luseno (2004), "Decomposing Producer Price Risk: An Analysis of Livestock Markets in Northern Kenya" *Food Policy* 29 (4): 393-405, Christopher B. Barrett, Francis Chabari, DeeVon Bailey, Peter D. Little and D. Layne Coppock (2003), "Livestock Pricing in the Northern Kenyan Rangelands," *Journal of African Economies* 12 (2): 127-155, John McPeak and Christopher B. Barrett (2001), "Differential Risk Exposure and Stochastic Poverty Traps Among East African Pastoralists," *American Journal of Agricultural Economics* 83 (3): 674-679, Kevin Smith, Christopher B. Barrett, and Paul W. Box (2001), "Not Necessarily In The Same Boat: Heterogeneous Risk Assessment Among East African Pastoralists," *Journal of Development Studies* 37 (5): 1-30, Peter D. Little and John G. McPeak, editors (forthcoming), *Livestock Marketing in Eastern Africa: Research and Policy Challenges* (London: Intermediate Technology Development Group Publishing).

research objectives to improve livestock productivity such as improving animal disease control and resistance, better feed inputs, as well as range and water management, research can help east African pastoralists break out of (or avoid falling into) poverty traps by improving scientists', policymakers' and pastoralists' own understanding of the relationship between the livestock, capital and skills people possess – their primary assets in this context – the institutions that govern local marketing, disease control and resource access arrangements, and the dynamics of the closely coupled human and natural systems that characterize the east African rangelands. Rainfall and violence will remain major drivers of both human welfare and the natural environment in the east African rangelands. But there is great scope for research to help develop viable nonpastoral livelihoods in the region and to enhance the resilience of traditional pastoralist livelihoods.

The Highlands of Kenya and Madagascar⁴

In many ways the subhumid highlands of central Madagascar and central and western Kenya could hardly be more different from the east African rangelands. Ample rainfall enables diverse agroecologies and livelihoods built around multiple annual and perennial crops and town-based employment opportunities, with limited indigenous and cross-bred livestock production based on restricted or zero-grazing. High population densities lead to small farm sizes, typically of a hectare or less. And natural resource management problems typically concern soil conservation and fertility management, rather than range management. Nonetheless, survey data from research sites in these highlands settings similarly find half or more of the population consistently living below the international extreme poverty line of US\$1/day per capita, most of the chronically poor apparently caught in a poverty trap.

⁴ See Barrett et al. (forthcoming), Christine M. Moser and Christopher B. Barrett, "The Disappointing Adoption Dynamics of a Yield-Increasing, Low External Input Technology: The Case of SRI in Madagascar", *Agricultural Systems*, vol. 76, no. 3 (June 2003): pp. 1085-1100, Bart Minten and Christopher B. Barrett, "Agricultural Technology, Productivity, Poverty and Food Security in Madagascar," June 2005 Cornell University working paper, Christopher B. Barrett, Christine M. Moser, Oloro V. McHugh and Joeli Barison (2004), "Better Technology, Better Plots or Better Farmers? Identifying Changes In Productivity And Risk Among Malagasy Rice Farmers," *American Journal of Agricultural Economics* 86 (4): 869-888, Alice N. Pell, David M. Mbugua, Louis V. Verchot, Christopher B. Barrett, Lawrence E. Blume, Javier G. Gamara, James M. Kinyangi, C. Johannes Lehmann, Agnes O. Odenyo, Solomon O. Ngoze, Bernard N. Okumu, Max J. Pfeffer, Paswel P. Marenja, Susan J. Riha and Justine Wangila, "The Interplay Between Smallholder Farmers and Fragile Tropical Agroecosystems in the Kenyan Highlands," February 2004 Cornell University working paper, Christopher B. Barrett (1999), "Stochastic Food Prices and Slash-and-Burn Agriculture," *Environment and Development Economics* 4(2):161-176, Christopher B. Barrett (1997), "Food Marketing Liberalization and Trader Entry: Evidence from Madagascar," *World Development* 25 (5):763-777, Christopher B. Barrett (1996), "Urban Bias in Price Risk: The Geography of Food Price Distributions in Low-Income Economies" *Journal of Development Studies* 32 (6): 830-849, and Christine M. Moser, Christopher B. Barrett and Bart Minten, "Missed Opportunities and Missing Markets: Spatio-temporal Arbitrage of Rice in Madagascar," January 2005 Cornell University working paper.

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The challenge of sustainable poverty reduction in this setting originates in meager endowments of land, livestock and financial capital that limit both agricultural productivity and educational attainment. Those with secondary education can often find remunerative non-farm employment that provides a productive pathway out of agriculture permanently, a steady stream of cash to finance on-farm investment in improved technologies and key purchased inputs (e.g., fertilizers and improved seed), and/or helpful diversification against the risks inherent to crop and livestock production. Similarly, those blessed with enough good land or improved livestock breeds can afford to sustain or build their soils and herds through basic maintenance expenditures and strategic investments in upgrading technologies. They operate in essentially homeostatic systems with stable or slowly improving livelihoods based on a stable agroecology.

By contrast, those born into poverty commonly cannot afford basic purchased inputs or even the meager investments required to upgrade to high-yielding, locally available technologies. They lack the land, labor or cash necessary to make such investments, leaving them trapped in a vicious cycle wherein they cope with regular crises by depleting the soils and forests on which their children's future livelihoods depend. Depleted soils become more difficult and expensive to restore and more prone to infestation by pests and noxious weeds such as striga. Chronic undernutrition and limited capacity to pay for preventive or curative medical treatment leave the poor vulnerable to health shocks, which are the single biggest cause of household collapse into long-term poverty, underscoring the instrumental importance of protecting human assets to sustainable poverty reduction, quite apart from the intrinsic value of safeguarding human health.

Breaking the chronically poor out of poverty traps in these highland mixed systems depends fundamentally on identifying the dominant feedback patterns in the system and the ranges of different asset holdings at which these patterns shift, endogenously igniting accumulation through favorable reinforcing effects. The complementarity between biophysical and social sciences research becomes especially evident in these systems, where incentives for technology adoption depend fundamentally on coordination among neighboring farmers, on access to credit and insurance mediated by informal social networks as well as microfinance groups and formal financial institutions, and on the evolving organization of post-harvest crop marketing, processing and storage.

Six Key Features of The Poverty Traps Concept

Several key, common features emerge as one reflects on either the evolving literature on poverty traps or on specific cases such as those just discussed.

1) Focus on dynamics:⁵ Mainstream conceptualizations of poverty emphasize static, “snapshot” views that identify who was poor at a given moment in time. With the emergence of longitudinal household and individual data, the emphasis is shifting to dynamic or “video” views that distinguish those who regularly exit or fall into poverty – the “transitory poor” – from those who become or remain persistently poor – the “chronic poor”. The poverty trap conceptualization focuses on chronic poverty as the category of greatest concern, not least of which due to the hopelessness it engenders and the socioeconomic polarization it often reflects.

This approach not only permits a richer description of poverty, it also replaces conventional, arbitrary definitions of poverty lines with a behavioral foundation. The *dynamic asset poverty line* is the point at which individuals, households, or still more aggregate units of analysis begin to accumulate wealth endogenously, the point at which time becomes an ally of the poor as they begin to grow naturally towards a satisfactory steady state standard of living. The poverty traps approach thus emphasizes not only the place where people presently find themselves, but equally the expected longer-term equilibrium towards which they are headed and the speed at which they converge towards that longer-term equilibrium or steady state.

This encompasses and generalizes the idea of vulnerability, which projects probabilistically from current conditions to likely future ones. The main difference is that the poverty traps approach emphasizes the natural dynamics of key assets (e.g., soil fertility degrades under continuous cultivation without nutrient amendments, livestock naturally reproduce, life cycle effects lead the young to accumulate assets while the elderly decumulate, etc.), which the existing literature on vulnerability analysis typically ignores. This enables assessment of the sustainability of short-run improvements in poverty indicators. For example, recent results from South Africa suggest that households with asset holdings up to nearly twice the level that typically yields earnings equal to the local poverty line tend to backslide into poverty over time.⁶ Apparent gains in poverty reduction may be misleading and short-lived without adequate attention to the natural dynamics of asset holdings.

2) Multiple dynamic equilibrium:⁷ Early development theorists (Hirschman, Myrdal, Nurkse, Rosenstein-Rodan, etc.) emphasized the possibility of a “low-level equilibrium trap” into which individuals and entire economies could fall. This important idea was largely lost because social scientists lacked the mathematical and statistical tools then to

⁵ For further background, see Christopher B. Barrett, “Rural Poverty Dynamics: Development Policy Implications,” in David Colman and Nick Vink, editors, *Reshaping Agriculture’s Contributions To Society* (Oxford: Blackwell, 2005), and Michael R. Carter and Christopher B. Barrett, “The Economics of Poverty Traps and Persistent Poverty: An Asset-Based Approach,” *Journal of Development Studies* (forthcoming).

⁶ See Michelle Adato, Michael Carter and Julian May, “Exploring Poverty Traps And Social Exclusion In South Africa Using Qualitative and Quantitative Data“ *Journal of Development Studies* (forthcoming).

⁷ See Lybbert et al. (2004), Barrett et al. (forthcoming), and Barrett and McPeak (forthcoming).

formalize it and to test its hypotheses. Now that formalization and testing are feasible, the idea is resurfacing that there may be multiple stable states separated by unstable dynamic equilibria, critical thresholds – or “tipping points” – at which the dynamics of accumulation and well-being tend to shift. One such threshold represents the *dynamic asset poverty line* referred to above. One consequence is that small, marginal investments in transfers to the very poor commonly prove unsustainable and unproductive. By contrast, improved access to more remunerative markets and more productive technologies can generate permanent gains by changing investment incentives and accumulation dynamics. Another important implication of multiple equilibria concerns targeting and intervention design: people positioned differently vis-à-vis a given threshold may need quite different forms of assistance.

3) Risk matters:⁸ The other crucial implication of the existence of multiple dynamic equilibria and tipping points is that seemingly transitory shocks can have permanent consequences. One-off positive shocks can bump people beyond the threshold and onto a path of self-reinforcing accumulation and productivity improvement. Conversely, an episode of illness, an unemployment spell, crop or herd loss due to drought or disease, etc. – especially a sequence of shocks without breathing space for recovery – can knock people below the tipping point and into predictable decline towards a low-level equilibrium. More than half of declines into poverty in South Africa, 1993-98, are estimated to have been structural, due to loss of productive assets (capital, adult workers, land, etc.). Similarly, more than 2/3 of declines into poverty in Uganda and western Kenya have been attributable to health shocks. Mere vulnerability to such shocks – let alone suffering them – can induce precautionary behaviors in which people rationally trade off higher expected earnings for reduced exposure to downside risk, thereby trapping themselves. Productive safety nets that provide credible insurance against catastrophic asset loss and that facilitate rapid recovery therefore become central to poverty reduction strategies. Note that productive safety nets in this sense are not necessarily targeted to the poorest – as is common in “safety nets” as the term is often used to refer to income support programs – but rather to those falling to a critical asset threshold that defines their capacity to recover from a shock naturally. Designing and implementing effective productive safety nets – and securing necessary political support for the triage they imply – will require wide-ranging reforms, from the global food aid system to NGO post-drought livestock restocking projects.

⁸ See Stefan Dercon, editor, *Insurance Against Poverty* (Oxford: Oxford University Press, 2004), Christopher B. Barrett and Daniel G. Maxwell, *Food Aid After Fifty Years: Recasting Its Role* (London: Routledge, 2005), Christopher B. Barrett and Michael R. Carter, “Risk and Asset Management in the Presence of Poverty Traps: Implications for Growth and Social Protection,” June 2005 paper for World Bank/DFID workshop on “Linking Social Protection and Growth: Concepts, Assessing Empirical Evidence, Developing the Future Agenda”, Anirudh Krishna, Daniel Lumonya, Milissa Markiewicz, Firminus Mugumya, Agatha Kafuko, and Jonah Wegoye, “Escaping Poverty and Becoming Poor in 36 Villages of Central and Western Uganda” *Journal of Development Studies* (forthcoming), and Barrett and McPeak (forthcoming).

4) Exclusionary mechanisms:⁹ Another critical insight from the poverty traps literature is that poverty traps can only exist when certain people are excluded from opportunities that are the gateways to sustainable growth and a high-level equilibrium living standard in the longer-run. No one would freely choose a low-level equilibrium over a high one. Thus when people occupy low-level stable states, they implicitly reveal the presence of exclusionary mechanisms. These are often defined by caste, ethnicity, gender, race, religion or other cultural markers that define group identity and shape labor and financial markets, residential patterns, and the nature, quality and effectiveness of the social networks people create for themselves. Some exclusionary mechanisms are defined by geography, in lands that are less favored by both nature and governments (i.e. they suffer poor institutional and physical infrastructure, low rainfall, infertile soils, virulent local disease strains, etc.).

In economic terms, exclusion is most commonly manifest in lack of access to key financial services – credit and insurance – necessary to build and protect assets, to invest in improved technologies and to access higher-return markets. When demand for credit or insurance is not met directly through direct financial markets, the poor resourcefully find other means to resolve their latent demand for finance. However, these adaptive responses can extract a high cost in terms of a family or community's future welfare. For individuals without savings, their choices are often limited to distress sales of the limited assets they possess, or market participation, technology adoption and investment decisions that provide “quasi-credit” but that have a significant opportunity cost in the future. Such “displaced distortions” are a hallmark of poverty traps.¹⁰

5) Multi-dimensionality: Poverty is an inherently multidimensional concept encompassing limited opportunities and capabilities, vulnerability, powerlessness and the experience of ill-health, illiteracy, homelessness and other undesirable conditions. Moreover, poverty has multidimensional causality originating in limited control over key productive assets, low biophysical productivity of those assets, poor terms of trade through market and nonmarket institutions of exchange, limited opportunities due to sociopolitical or financial exclusion, or – most commonly – combinations of these. Appropriate interventions, much less the most cost-effective ones, will therefore vary across sites and target subpopulations and commonly need to be coordinated across multiple sectors at once. This poses unavoidable design challenges.

⁹ See Christopher B. Barrett, editor, *The Social Economics of Poverty: Identities, Groups, Communities and Networks* (London: Routledge, 2005), Christopher B. Barrett and Joan Esteban, editors, “Social Groups and Economic Inequality,” special issue of *Journal of Economic Inequality* (forthcoming), and Moser and Barrett (2003).

¹⁰ See Christopher B. Barrett, “Displaced Distortions: Financial Market Failures and Seemingly Inefficient Resource Allocation,” USAID BASIS CRSP Policy Brief, August 2005.

6) Feedback effects across scales of analysis:¹¹ The multi-dimensionality of poverty in both its manifestations and its causality signals the prevalence of spillovers across sectors and scales of analysis. Feedback flows both from micro-to-macro and from macro-to-micro levels, with critical intermediation by meso-level institutions ranging from local governments to community groups to resource user associations to markets. It often takes integrated interventions at multiple scales to liberate a system trapped in a low-level equilibrium. For example, limited uptake of promising new technologies by African smallholder farmers is clearly at the root of much poverty and hunger on that continent. Slow technological change in African agriculture has multi-factorial causality: weak scientific capacity in national agricultural research and extension services (including universities), dysfunctional local institutions that undercut security of resource control, depleted soils that limit productivity (and therefore the attractiveness) of any new crop technology, weak market institutions that do not reliably transmit information and inputs on a timely basis nor offer remunerative returns for farmers' surpluses, underprovision of financial services necessary to facilitate investment and to insure against loss in the transition between systems, etc. These conditions are mutually reinforcing. Any effective strategy to move the system to a new, higher-level equilibrium will almost surely require interventions at multiple scales.

Implications For Agricultural Research and Development

Overcoming poverty traps, as reflected in the six key features enumerated above, requires science-based solutions to asset accumulation and to agricultural productivity growth through improvements to production and processing technologies, natural resources management practices, and policies and institutions at scales of human organization. This is true not just for the majority of the chronic poor in the world who work at least part-time in agriculture, and whose labor productivity is thus directly related to technological advances and improved terms of trade in agriculture, but for all the world's poor due to the profound impact food prices have on real incomes and standards of living. Three implications for CGIAR research emerge from the poverty traps concept.

(1) Take An Asset-Based Approach:¹² The poverty traps perspective emphasizes the importance of an asset-based approach that focuses on the accumulation of stocks of productive assets, such as labor, land, livestock and financial and manmade capital, which form the base of household, community and regional livelihood strategies. The emphasis is not just on the quantity of holdings but equally in terms of their quality (e.g., the quality of soils on a given stock of land, the health and educational status of a

¹¹ See Christopher B. Barrett and Brent M. Swallow, "Fractal Poverty Traps," *World Development* (forthcoming), and Christopher B. Barrett, Frank Place, and Abdillahi A. Aboud, editors, *Natural Resources Management in African Agriculture: Understanding and Improving Current Practices* (CAB International, 2002).

¹² See Carter and Barrett (forthcoming).

family's stock of labor, etc.). Where property rights are secure and markets operate well, quantity and quality are jointly reflected in the value of an asset, capturing the discounted present value of the expected future stream of net income the asset can generate. This perspective differs significantly from the conventional approach to poverty analysis based on flows of income or expenditure rather than stocks of assets in that it focuses on the underlying state variables that characterize the dynamics of the system. The asset-based approach also enables essential distinctions to be drawn between sustainable, structural transitions out of poverty and unsustainable, temporary movements out of or into poverty. The practical challenges thus become (i) building the stock of productive assets under the control of the chronically poor, so as to help lift their capabilities beyond the dynamic asset poverty line, and (ii) protecting the assets of the currently non-poor lest they be knocked into a poverty trap.

CGIAR research can do much on both fronts. Its research on collective action and property rights institutions and on natural resources management speaks directly to the incentives to build up assets and people's ability to protect the natural assets they possess. Research on improving the nutritional content of staple commodities and on stimulating expanded supply and distribution of micronutrient-rich agricultural products such as fruits, vegetables and animal proteins is similarly fundamental to building and protecting the stock of human capital within poor households. Research on increasing farmer resilience to biotic and abiotic stresses to crops and livestock likewise plays a valuable role in preventing asset loss through distress sales to cope with adverse income shocks.

(2) Emphasize Productivity Growth: Increasing the productivity of the assets the poor already control is every bit as important as building and protecting the stock of productive assets they own. This is the primary arena in which the CGIAR's past research has yielded major impacts on poverty reduction, by increasing "the pile of grain" produced per hectare and per worker, thereby both boosting the incomes of poor farmers and the real wages of poor workers.¹³ Since the rural poor control mainly labor and less favored lands, direct interventions to boost labor productivity and agricultural productivity in less-favored lands will likely pay especially high dividends.¹⁴ But because all poor people's productivity is affected by the quality and cost of food, and poor net food buyers benefit proportionately more than others from downward pressure on real food prices – because they spend a larger share of their income on food – productivity growth in food production in high potential, surplus-generating areas is likewise terribly important to poverty reduction. These are complementary emphases, with productivity improvements in less-favored lands favoring those more difficult to reach through markets, while growth in higher-potential zones benefits workers through

¹³ See Robert E. Evenson and Douglas Gollin, eds., *Crop Variety Improvement and Its Effect on Productivity: The Impact of International Research* (Wallingford, UK: CAB International, 2002).

¹⁴ See Shenggen Fan and Peter Hazell (2001), "Returns to Public Investments in the Less-Favored Areas of India and China," *American Journal of Agricultural Economics*, 83(5): 1217-1222.

real wage effects. In the short-run, the big winners are early adopters – typically larger, wealthier farmers – while in the medium-to-long-run, the big winners are the poor who depend on market purchases of food. The CGIAR needs to remain alert to the damage technological change can impose on non-adopter net sellers, about whom we know surprisingly little. This awareness must not induce timidity, however. Broad-based adoption of yield-improving technologies can generate productivity growth that greatly benefits most distinct subpopulations of the poor: producers as well as consumers.¹⁵

It bears emphasis that improved terms of trade through input and output marketing can stimulate productivity growth just as well as technological advances. Technologies and markets are intrinsically complementary means of advancing the productivity of asset stocks. Emerging CGIAR research on farmer- and community-level organization for commodity marketing, input procurement systems, disease management and technical barriers to trade, the provision of extension and other services, etc. all relate directly to these questions of market performance for the poor, as does scientific research into natural resources management, animal disease control and related issues central to sustaining the natural capital stock of the poor.

(3) Systems Thinking Is Essential: Third, since households worldwide employ a diversified set of activities and because of the complex web of feedback in human-managed rural agroecologies, we need to think in terms of systems. Very few households only cultivate – much less cultivate a single commodity – or just herd livestock or solely fish. Most farm households are also involved in the non-farm rural economy and/or urban labor markets through family members who migrate seasonally or permanently and provide regular remittances.¹⁶ Households are manifestly engaged in ongoing portfolio management, allocating scarce productive assets to different activities so as to balance income-generating and risk-management objectives and to try to capitalize on prospective synergies among activities. Many poor people nonetheless systematically choose lower return – sometimes even low-return and high-risk – options because more attractive ones are beyond their reach due to financing or skill constraints.¹⁷

¹⁵ See Minten and Barrett (2005).

¹⁶ See Thomas Reardon (1997), "Using Evidence of Household Income Diversification to Inform Study of the Rural Nonfarm Labor Market in Africa," *World Development*, 25 (5), 735-748, and Thomas Reardon, Kostas Stamoulis, Arsenio Balisacan, M.E. Cruz, Julio Berdegue and Bonnie Banks (1998), "Rural Nonfarm Income in Developing Countries," in *The State of Food and Agriculture 1998*, Rome: FAO.

¹⁷ See Stefan Dercon and Pramila Krishnan (1996), "Income Portfolios in Rural Ethiopia and Tanzania: Choices and Constraints," *Journal of Development Studies* 32(6): 850-875, Christopher B. Barrett, Thomas Reardon and Patrick Webb (2001), "Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics and Policy Implications," *Food Policy* 26 (4): 315-331, and Christopher B. Barrett, Mesfin Bezuneh, Daniel C. Clay, and Thomas Reardon (2005), "Heterogeneous Constraints, Incentives and Income Diversification Strategies in Rural Africa," *Quarterly Journal of International Agriculture* 44 (1): 37-60.

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The CGIAR has been the intellectual hub of farming systems research, appropriately integrating crops, livestock, fisheries and natural resources management so as to capture apparent feedback effects within systems. It has likewise pushed the frontier in understanding the inextricable economic and biophysical links between rural and urban systems and between farm and rural nonfarm economies and ecosystems. A nascent body of research is probing these linkages and their prospective effects on both the natural environment and on poverty dynamics. Efforts to capture the multi-scalar spillover effects within systems – how macro-level phenomenon affect meso-level institutions and thereby micro-level incentives and behaviors, as well as these linkages in reverse, from micro through meso to macro – remain in their infancy, however. With the global push towards decentralized governance of financial, human and natural resources, however, the necessity of understanding linkages across scales of analysis is becoming ever more pronounced.

Conclusion

This brief background note has enumerated six key features of the poverty traps conceptualization of the challenge of sustainable poverty reduction and identified three key implications for international agricultural research, illustrating these by reference to two case studies from places in Africa where my multidisciplinary collaborators and I have been working for several years. I want to close by underscoring the preliminary nature of our collective understanding of the crucial details of and mechanisms behind poverty traps. The popular rhetoric of poverty traps has gotten well ahead of the scientific understanding of the phenomenon. The CGIAR can contribute significantly to closing that gap. Because the concept of poverty traps carries potentially powerful implications for the design of research for development as well as for development interventions, there is great value in research to firm up our conceptual and empirical understanding of why poverty traps emerge and how best to equip poor peoples to escape them. The CGIAR can play a key role in this high stakes research agenda to support sustainable reduction of poverty and hunger, both within the biophysical sciences through conservation and improvement of crop and livestock genetic material as well as improved management of water, land and forest resources, and within the social sciences through identification of policy and institutional options to facilitate access to and uptake of improved technologies and more remunerative markets. The prospective role for science in advancing the global goal of sustainable poverty reduction has never been greater.