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From Poverty Traps to Indigenous Philanthropy: Complexity in a Rapidly Changing World

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From Poverty Traps to Indigenous Philanthropy: Complexity in a Rapidly Changing World

Stephen Jarrett

Summary

Poverty persists around the world and is exacerbated by growing inequality especially within countries. The majority of the poor are 'trapped' in specific rural and urban localities in countries now classified as middle-income where domestic policy and resources are not sufficiently focused on poverty and where international aid is not significant. The majority of those who manage to move out of poverty report that they achieve this through their own initiative, adapting to changing circumstances. Poverty must be treated as principally domestic and local, with the poor as the principal actors in its reduction.

Poverty is characterised by its multidimensionality, spanning across a number of factors that can be broadly related to education, health, finance and environment, and which can create poverty traps from which the poor have difficulty in escaping. The dominance and interconnectedness of any of these factors can differ between poverty traps, as can the effect they have on different population groups, with young children and girls being particularly vulnerable. Traditional coping mechanisms help alleviate some immediate aspects of poverty in some populations, but with increasing urbanisation they are weakening considerably, and a greater 'monetisation' of help is emerging. More modern coping mechanisms have come into play, not just support from the diaspora, but also help mechanisms being set up by the growing number of wealthy and influential indigenous philanthropists in developing countries, who are on the 'winning side' of growing inequality.

Poverty is closely aligned with deficits in assets, where assets are broadly defined as physical, human, infrastructural and institutional, and originate in the household, community, private sector and the State at local, regional and national levels. The State is often unable or unwilling to deal with poverty, given the difficulty and cost of reaching the poor, and the low political return. Publicly-run services, such as health and education, which are central to building human capital, are notoriously ineffective, with public workers underpaid and conducting private business on the side, leading to the poor, especially in middle income countries, using the private sector for many of their needs. Public works programmes and social protection measures do not have significant penetration amongst the poor in many countries, and the granting of entitlements to specific population groups is of generally low coverage. The rapid spread of mobile phone access, even within poorer populations, is a powerful new asset to be taken into account, both in terms of immediate access to information and also as a channel for financial flows, both of which can enhance livelihoods.

The poor, trapped in poverty, the State, deficient in its response to poverty, and the evolving development environment, spurred by changing inter-country alliances, rapid technological change and the increasing activity of the private sector and indigenous philanthropy, all demand a new way of analysing solutions to poverty. This has to be context-specific and with the engagement of all stakeholders, including the poor themselves, throughout the entire process of decision-making and action. Analysis using complexity science, which is potentially better able to address the multidimensional framework of poverty, should be added to the more traditional and often sectoral linear cause-effect analyses. Methods and tools generated from complexity science offer an interdisciplinary approach to reaching emerging solutions based on a multiplicity of factors facing the poor in any given locality, using local knowledge and accounting for patterns of change that are taking place. Pluralism

is considered key to analysing poverty and identifying and monitoring solutions, and applies as much to the State as it does to the for-profit and not-for-profit private sector interventions.

A central question to be answered in analysing emerging patterns will be how to increase the poor's physical (financial) and human (labour) assets to enable their effective access to infrastructural (services) and institutional (political) assets. The State, through its governmental bodies and inter-governmental allies, will have the key responsibility of ensuring the availability of necessary and appropriate infrastructural and institutional assets, and providing entitlements to specific populations, aimed at reducing inequality of access and opportunity. The private sector, both for-profit and not-for-profit, will play a significant role in building physical, human and infrastructural assets, both through contracting with the public sector and through indigenous and global philanthropy.

Keywords: poverty; inequality; assets; community; technology; philanthropy; complexity.

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Introduction

The development panorama has been changing dramatically in recent years, not least because of the increasing interdependence between countries, the instigation of new country-country alliances and economic growth in many developing countries. A number of previously low-income countries, notably some with large populations, have graduated to lower middle-income status. Developing countries' share in global investment and savings has grown from less than 20 per cent to almost one-half in the last 15 years; two-thirds of the growth in global investment over the last ten years has originated in developing countries (World Bank 2013). Rapidly increasing South-South cooperation, with a greater emphasis on trade and collective action, is changing the aid environment.¹ Traditional government-to-government aid is waning, while philanthropy, both indigenous and global, is expanding, impacting on policy and, in some cases such as health and education, playing an increasingly dominant role. The support of the diaspora principally in intra-family help runs into the hundreds of millions of dollars annually.

The numbers of the poor have not decreased notably, except in China, in the midst of this changing panorama, but they are now mostly located in lower middle-income countries and increasingly found in urban centres. Many are trapped in poverty which is multidimensional and constantly changing in nature, with insecurity and the illegality of many settlements major exacerbating factors. One person in five lives in poverty and one child in five is un-immunised; this inequality and the growing gap between the rich and the poor is one of the most serious issues facing the world today.

The State response to poverty is generally weak, as often the poor are hard to reach even in urban locations and the cost can be excessive against the likely meager political gains. While there is positive evidence around the effectiveness of cash transfers to specific population groups, whether targeted or through entitlement, increased financial assets at the household level may have limited impact in localities where there are either no or very poor public services available. A confounding factor is that the State, as well as many international donors, tackles poverty through sectoral sights often with little intent of convergence. This disconnect between State sectoral action and the poor's multifaceted needs can be wide² and may not be helped with the potentially skewed effect of globally-driven goals to which countries subscribe.³

The changing development panorama is being rapidly influenced by new technologies, notably the ubiquitous nature of the mobile phone which is becoming widely accessible to the poor. This is not only providing current information vital to livelihoods such as food prices and entrepreneurship support, but also enabling surveillance and reporting systems to be instantaneous for analysis and decision-making. This is a powerful tool for the poor for making decisions and being more effective negotiators with local intermediaries and service providers. Furthermore, the large data sets now residing in mobile phone networks have the capability of analysing consumer behaviour including the emergence of technology-based communities and social networks. The State, in turn, will come under increasing pressure to enhance its analytical and response capabilities.

¹ South-South cooperation is not without negative consequences; the spread of agribusiness investments into regions with high but poorly understood agricultural drought and other hazards, generates risks of future and more severe food price hikes and further threatens the food security of low-income rural and urban households (see UN 2103).

² Fragmentation is widespread in approaches to poverty – including the US federal government's efforts to combat poverty, which entails more than 80 programmes across 10 different agencies, each with a different data system and reporting requirements (see Kneebone 2013).

³ In this context, globally-set poverty reduction goals may be of less relevance in a post-2015 world, giving way to specific goals relating to countries or country blocs, or even sub-regions within countries (see Greenhill 2012).

This changing development panorama and the complexity of poverty cannot be ignored and can no longer be addressed through fragmented approaches and cause-effect analyses. The aim of this paper is to outline the principal factors that need to be taken into consideration in developing a more comprehensive approach, with the poor at the centre of design and action in addressing poverty. It focuses on the multidimensional nature of poverty which causes poverty traps in both urban and rural areas and the need for the poor to have ready access to physical, human, infrastructural and institutional assets. It looks at the failings of the State to address poverty and the consequent reliance of many of the poor on the private sector.

The rapidly changing development environment, particularly with regard to the impact of South-South cooperation, mobile phone penetration and indigenous philanthropy, together with the multidimensional framework of poverty, points the paper to emphasise the potential role of complexity science in determining emerging patterns from the multitude of factors trapping the poor in poverty. The poor as key actors in reducing poverty and inclusiveness are then stressed in specific directions outlined for tackling poverty going forward. The paper throughout stresses key determinants in rethink the directions to take in reducing poverty, which include a focus on complexity, as opposed to simplicity, the importance of local, as opposed to global, the need for pluralism, as opposed to sectoral silos, and the opportunity of private sector involvement.

1 The poor

More than 20 per cent of people in developing countries live below the internationally-recognised poverty line of \$1.25 per day;⁴ this sole metric of poverty, however, is currently being questioned (see below). An estimated 75 per cent of the poor live in countries now classified as lower-middle or middle income.⁵

1.1 Poverty traps are multidimensional and self-perpetuating

Poor people, more than others, face conditions that can be described as local, complex, diverse, dynamic, uncontrollable and unpredictable, with living being an improvised performance where people continuously adapt to changing conditions (Chambers 2010). In addition, poverty affects population age groups differently; children (especially young children) experience poverty differently from adults in having specific needs, such as in nutrition, health and education, which can impact a child's long-term development (Minujin 2012). Girls' vulnerabilities in relation to poverty dynamics are different to those of boys, including early marriage and dangers of early pregnancy, HIV/AIDS and illiteracy (Harper 2012).

This complexity means many of the poor fall victim to poverty traps which are multidimensional and can be exacerbated by traps at different levels – macro (national), meso (provincial/district), and micro (community/household/individual) levels (Barrett 2006). These traps are generally interrelated and self-perpetuating (Azariades 2005; Matsuyama 2005; Dasgupta 2007).

Ultimately though, concern about poverty needs to be about people and their livelihoods; thus, focusing on micro level solutions, and deriving 'fixes' at other levels as necessary, would ensure people-centred approaches are to the fore. At the household level, 12 factors

⁴ An estimated 1.29 billion people in 2008 lived on less than \$1.25 a day, equivalent to 22.4 per cent of the developing world population, down from 1.9 billion in 1990, or 43.1 per cent (see World Bank 2012); China represents a significant proportion of those who have moved out of poverty.

⁵ There is a new bottom billion who do not live in fragile and conflict-affected areas but largely in stable, middle-income countries (see Sumner 2010).

have been identified as making up this multidimensional framework of poverty traps (Smith 2006); these factors can be arranged under *Education* (illiteracy, low skill levels, child labour), *Health* (under-nutrition and illness, high fertility, mental health problems), *Financial* (subsistence economy, lack of working capital/credit constrained, debt bondage), and *Environmental* (farmland erosion, mismanagement of common property, criminality). Many of these factors result from inequalities in income distribution and in access to productive resources, basic social services, opportunities, markets, and information (UN 2005). In any given poverty situation, there are likely to be factors that are more dominant and these need to be understood and addressed, together with other additional factors which could have a bearing on poverty.

In broad terms, spatial disadvantages, social discrimination, poor work opportunities, insecurity and limited citizenship (participation in society) underlie poverty (Addison 2009). Spatial characteristics appear to be critical factors in analysing poverty traps. Geography is strongly correlated with inequality, even after controlling for demographic and economic conditions.⁶ This correlation is observed in both rural and urban areas, but there are variations according to specific population groupings (Elbers 2003). There are a number of phenomena unique to poverty in urban settings, including a greater dependence on cash income, weaker informal safety nets, and lifestyle changes (Ruel 1999).⁷ Living in a poor rural area lowers the productivity of a farm-household's own investments, which reduces the growth of consumption (Jalan 1998).

Significant work has been done on quantifying thresholds for poverty, principally from an economic perspective. There is a strong argument to be made and a consensus being formed, however, for identifying and measuring a range of deprivations suffered in poverty, which would appear to be more consistent with the multidimensional framework of poverty (Alkire 2012). Furthermore, subjective wellbeing, indicated by the poor themselves, and socioeconomic position are not only different concepts but are also not strongly co-related; subjective wellbeing indicators, which includes many domains of life, can make an important contribution to the study of poverty because they provide new information beyond what traditional socioeconomic indicators provide (Rojas 2004).

1.2 Traditional help mechanisms vary as to their impact on poverty reduction

Traditional help mechanisms have historically played an important role in survival in the face of poverty. Three patterns of interplay appear to be dominant in these mechanisms: *help* between actors living in close proximity (family or neighbours), likely to be small material needs to maintain wellbeing; *help* relying on blood affinity, involving higher proportions of available assets, with a high imperative not to refuse, based on reciprocity or cooperation and acting as an investment in inter-generational survival; *help* collectively constructed through local associations, pre-dominantly material, rule-based and designed to provide insurance or movement for members (Wilkinson-Maposa 2005). Women and men often tend to belong to different, at times complementary, support networks (Krishna 1999). In Indian slums, social ties tend to be stronger amongst women as they often help each other in times of family emergency or emotional need, also sharing a sense of gender discrimination which enhances solidarity (Thomas 2002).

One constraint of traditional help mechanisms is that they often lack innovation in their own historically-driven self-reinforcement and aversion to risk (Bowles 2006). Traditional societies may have few opportunities for 'weak' links (heterodox individuals at the periphery of the

⁶ Global inequality has begun to fall, although emerging economies are more unequal than rich countries; the majority of the people on the planet, in fact, live in countries where income disparities are bigger than they were a generation ago (see *The Economist* 2012a).

⁷ The illegal nature of many urban settlements of the poor (e.g. slums) leads to the absence of public investment and a reliance on the private sector for services such as health care and schools.

society's social networks able to move between groups and become bearers of new information and ideas) and thereby less easily access information, innovation and human resources (Fukuyama 1999).⁸ A certain degree of poverty entrapment may result when poor and risk-averse households shun new or profitable activities in order to contain income risks (Morduch 2001). In addition, there are potential conflicts between rights and customs (e.g. inheritance and property rights) in traditional mechanisms (Alderman 2001).

There is some positive evidence on the impact of help mechanisms on poverty, as it pertains to increased cooperation and livelihoods, especially through savings and loans associations where trust and cooperation is often based on long-term learning processes, simple flexible rules established by members, the ability to enforce rules and allowing people to manage their own income (Lyon 2003; Boonperm 2009; Benda 2012; Thabethe 2012). In contrast, where mutual health associations exist to provide members with coverage especially of out-of-pocket expenses, evidence has shown that individuals from the richest quintiles were more likely to be enrolled (although with no exclusion of poorer quintiles) and that membership did not result in a significant effect in reducing out-of-pocket expenses (Chankova 2008). In south-east Nigeria, it was found that economic status and place of residence were factors that influenced people's willingness to pay for health insurance; insurance premiums would likely have to be subsidised by the State or its allies in order to reach a level of affordability for the poor (Onwujekwe 2010).

1.3 Resilience to poverty depends largely on access to assets

Resilience in resisting or recovering from negative effects of a changing environment is based on the assets and entitlements that individuals, households, and communities mobilise, putting vulnerability closely linked to asset ownership (Moser 2008). The poor's assets are broadly classified as *physical*, including private and common property rights, tools, structures, livestock, food, and financial capital, *human*, basically labour, *infrastructural*, including access to schools, health centres, transportation, storage, water and sanitation, and *institutional*, related to their rights and participation in decision-making in households and in and beyond the community (Khan 2001).⁹

In the absence of realistic prospects of formal sector employment, the vast majority of poor people rely on the meager assets they have, as well as those they can accumulate through the informal economy and support from help mechanisms, to sustain their livelihoods and enhance their welfare (Dani 2008). Inquiry has shown that nearly 4 in 5 people who have been able to move out of poverty cited individual initiative as the main reason (Narayan 2009).

1.4 Access to credit facilities for the poor has been increasing but with inconclusive evidence to date

The non-farm informal economy, particularly the development of household enterprises, have become an important vehicle for economic participation by the poor contributing to physical asset accumulation, growth and poverty reduction both in urban areas (as a primary occupation) and rural areas (as a secondary occupation); lack of access to credit and markets, cumbersome registration formalities, poor transport conditions, unrealistic taxes, insecurity and lack of business know-how are cited as constraints to these enterprises, and point to a clear role of the State in setting policies, regulations and laws that facilitate the informal economy (Kweka 2011). These enterprises are especially critical to women-headed households that often lack access to production resources (Sawada 2011). In spite of

⁸ Interestingly, successful women entrepreneurs are more likely to be at the margins of their community, or are single women with fewer pressures to conform (see Pínglé 2008).

⁹ This asset inventory is closely related to the 12 factors identified (above) as making up the multidimensional framework of poverty.

society's positive attitude to business-women in the Sudan, for example, they have immense problems in accessing finances and other services for starting and maintaining enterprises (Ali Musa 2012).

Microfinance has been considered to be one main area of building physical assets (Fukuyama 2002). Microfinance, in terms of microcredit, however, has been seen to lack rigorous quantitative evidence of any major impact in reducing poverty and empowering women, with one study actually finding increased labor activity and decreased school attendance by children aged 16–19 (Duvendack 2011; Augsburg 2012). A consensus is now emerging that problems with microfinance are rooted in the characteristics of the microfinance industry as they have developed over time (Weistroffer 2012). Nevertheless, FINCA International¹⁰ and KIVA¹¹ remain popular online 'people-to-people' giving operations, channeling loans and other financial instruments with funding principally from developed countries and with local franchises or partners as implementers; no systemic assessment, however, seems to be readily available on their non-financial outcomes. Such 'crowd-funding' is already taking root in Africa, where SliceBiz in Ghana, for example, allows investors to transfer cash into projects they like using mobile money (Kelion 2013).

2 The state

The State can be considered at the macro level as the political organisation of its citizens bearing the responsibility for the structures to preserve and develop public goods and ensure that they are available to every single member of society (Thierse 2009). The levels of inequality existing in many countries imply that this responsibility is not being fulfilled.

2.1 State organisation is often not conducive to addressing the multidimensional and interrelated factors of poverty

In terms of response to poverty, even with poverty alleviation programmes, there is a general disconnect between State central investment and community interest and priorities, with the State conspicuously absent, for example, in supporting the help mechanisms accessed by the poor (Swallow 2003; Addison 2009). This brings into question the role of the State in addressing poverty traps, especially as individual initiative is cited as a main reason for people being able to move out of poverty. The multidimensional nature of poverty would also question the applicability of simple solutions of linear causality and the effectiveness of sectoral silos, which make up the basic organisation of the State. One drawback for the State to address the inequality of poverty may be that its institutions are neither efficient nor egalitarian, and even moderate levels of inequality may deter collective action and cause unequal conventions to persist indefinitely (Bowles 2001).

Politically, there may be little advantage in reaching those captured in poverty traps – the per capita cost can be high and the returns low especially considering the limited citizenship and lack of voice of these populations. The main argument to address some aspects of poverty may relate more to states' adoption of global benchmarks, e.g. millennium development goals or rights, but this is limited given the lack of any significant means of enforcement. While the situation in middle income countries, where the majority of the poor live, has been improving based on recent economic growth, the results with regard to tackling poverty have been mixed with growth generally benefitting a small fraction of the population disproportionately and leading to increased inequality. In low income countries with limited budget space and historically-driven commitments, it is less likely that the State can address poverty traps to any significant level of success and may have to depend on international aid for the foreseeable future. This situation in middle and low-income countries is further

¹⁰ www.finca.org

¹¹ www.kiva.org

exacerbated by State expenditure contraction beginning in 2010 in many developing countries, despite vulnerable populations' urgent and significant need of public assistance (Ortiz 2012).

2.2 Health and education services often do not reach the poor in space nor time

Public health systems continue to have difficulty in reaching both the rural and the urban poor, let alone addressing the multiple causes and consequences of health inequity; furthermore, lack of access¹² to health care means the poor pay for care out-of-pocket and can be confronted with catastrophic expenses (WHO 2008). Governments in low and middle-income countries rarely focus on the poor in their policies or in the implementation or monitoring of health service strategies;¹³ the challenge remains to find ways to ensure that vulnerable populations have a say in how strategies are developed, implemented and accounted for in ways that demonstrate improvements in access by the poor (Peters 2008). A key characteristic of the health sector is the importance of skilled workers, and so the incentives that workers face have an important influence on both an individual worker's performance and that of the overall health sector (Bloom 2009). The poor salaries often provided to health workers though leads in most cases to dual job holding with the potential for competition for time, outflow of resources from the public sector (e.g. medicines) and conflicts of interest (Macq 2001; Jan 2005).

The incentives to reach the poor with health services are, therefore, often non-existent and the poor have to rely on non-governmental organisations (NGO) or private providers (oftentimes the same public health workers), for which there is normally willingness to pay due to the perceived quality of care received (but not necessarily ability to pay). In South Asia, 80 per cent of children in the lowest quintile who have acute respiratory infections and are brought for care use a private provider; while in Africa about 50 per cent of those who seek care outside the home go to private providers (Hanson 2008). The health challenge is exacerbated by the fact that 800 million people do not have access to clean water and a further 2.5 billion people do not have adequate sanitation, with women wasting 40 billion hours collecting water every year, children missing classes and girls too often dropping out of school when they reach puberty because of a lack of proper toilet facilities (Sirleaf 2013).

The number of children out-of-school stagnated between 2008 and 2010, with one in five young people failing to complete basic primary education.¹⁴ Associated years of schooling, nevertheless, has expanded substantially in developing countries in recent years, but drastic inequalities in attendance¹⁵ continue to exist across the income distribution and even free primary schooling has not led to markedly higher overall, or more pro-poor, attendance or completion rates at the secondary levels (Harttgen 2010). In many cases, educational quality is low¹⁶ which is not surprising as rapid expansion of primary and secondary education has strained countries' financial and human resources (Glewwe 2005). Teacher absenteeism, averaging 19 per cent in developing countries, is a persistent problem affecting education quality and attempts with providing bonus pay to teachers based on students' test scores

¹² Four main dimensions of access can be described: geographic, in distance and time; availability of the right type of care; financial in terms of willingness and ability of users to pay for services; acceptability of providers to the expectations of individual users and communities (see Peters 2008).

¹³ One exception may be the State focus on reducing or eliminating infectious diseases, given the threat across the entire population and beyond, and the consequent considerable resources available for programmes for infectious disease control including a considerable donor focus.

¹⁴ International aid to education also stagnated in 2010, after a decade of significant increases, and the outlook through 2015 is not promising (see UNESCO 2012).

¹⁵ Reducing inequality in attendance is not sufficient to reduce inequality in achievements, as drop-outs and poor progress within the educational system ensures that inequalities in achievements remain the same (see Harttgen 2010).

¹⁶ Poor learning outcomes, particularly in early grades, are associated with higher repetition rates and higher drop-out rates, and result in much higher costs for taking children from entry to completion of school (see Cortese 2012).

have had mixed results. Poor salaries for teachers can lead to pressure on parents to pay for extra lessons, materials and other costs. Private schools for the poor are burgeoning, especially in many urban areas where they are serving a majority of the population, with a quality higher than that of government schools provided for the poor, given that these private schools are business-dependent and directly accountable to parents' needs (Tooley 2009). A further challenge to education is the rapid advances in information and communications technologies, which are changing the skills demanded by labour markets, but also offering possibilities for accelerated learning and improved management of education systems (World Bank 2011). The risk though is that the digital divide between privileged and deprived groups can widen educational gaps implying that information technology infrastructure should rapidly expand to rural and deprived areas (Gulati 2008).

The poor are often at a significant disadvantage with this dysfunction in services that are critical to building human capital and an important factor in changing the poverty status of future generations. The question as to whether contracting-out health services by the State to the private for-profit and non-profit sectors has both advocates and detractors (Hanson 2008). Studies do suggest that contracting-out has in many cases improved access to primary health care services although the effects on equity, quality and efficiency are often unknown implying that the context in which contracting-out is implemented is a critical factor (Liu 2008). In education, strategic partnerships between private sector organisations and public bodies, with public authorities delineating the basic rules and directions, may be one option (Pessoa 2008). In both health and education, the poor are faced with out-of-pocket expenses notwithstanding the 'free' nature of services. This leads to the poor's greater use of private services in many instances, given their higher perceived quality, accessibility and accountability to the user.

2.3 Programme interventions to address poverty are often limited in scope and impact

Public works and cash transfer interventions have been areas where the State has attempted to support the building of physical, human and infrastructural assets at household and community levels. Public works programmes tend to be more effective than other forms of prevention and protection in reaching the poorest sections of the population when properly designed and when considered a guarantee of the right to work (Kabeer 2002). Such employment-based safety nets have the advantage of both transferring food or income in the short term while creating permanent local infrastructural assets, such as roads and irrigation channels, but challenges can be the need to implement during low labour season times (usually post-harvest), the potentially demeaning aspect of this work and the risk of gender inequity (Devereux 2002). Public works programmes are often tied to external resources (such as food aid), raising questions of sustainability. Furthermore, corruption can be a major factor undermining their effectiveness in poverty reduction (Tendler 2000; Kabeer 2002; Delavallade 2005).

Cash transfers, especially with women as recipients, have generally been found to promote positive outcomes, including increased spending on children's schooling and nutritious food, as well as contributing to social cohesion and women's participation in household decision-making. The most consistent evidence of success from schooling interventions in recent years, for example, comes from cash transfers targeted to the poorest segments of society conditional on children attending school¹⁷ (Orazem 2012). Little information is available, however, on whether transfers have improved the quality of services, questioning whether local services are able to cope with the increased demand created by transfers (Lagarde 2007; Forde 2012; Saavedra 2012).

¹⁷ It is recognised that conditional cash transfers may only succeed in countries where State institutions necessary to identify the poorest households, manage a large transfer programme, and monitor child attendance, are well developed (see Orazem 2012).

The State's involvement in cash transfer programmes, as seen in Africa, often target a limited proportion of the people or a certain vulnerable group; their fragmented nature and patchy coverage often reflect the lack of domestic ownership and coordination, especially in low income countries which rely heavily on donor funding (Garcia 2012). The reluctance of the State to invest in cash transfer programmes may be due to the conditions for success, which include the need for moderate (not small) transfer amounts and for a longer (rather than shorter) duration to make any significant impact, for the social-cultural context to be taken into account, for benefits to have a knock-on effect on micro-economies, and for structural transformation (strengthening markets, access to productive inputs) to be in place (Arnold 2011). In addition, the high transactions costs of reaching the poor have collided with donors' insistence on sustainability (Kabeer 2002). It has also been argued that cash transfers may further marginalise indigenous populations (Ulrichs 2012).

One means of addressing both agricultural production and poverty reduction in a number of developing countries has been the use of subsidised inputs, principally seeds and fertilizers.¹⁸ A clear consideration of the costs and benefits of subsidies though is necessary, compared to addressing market failures directly and using social policies to address poverty and food insecurity; smart subsidies (e.g. using vouchers) on a time-bound basis can be justifiable in some instances along with the necessary complementary interventions in rural roads and agricultural research and extension (Wiggins 2010). In Malawi, poor households that received vouchers were better off than non-recipients, with increased fertiliser use, higher maize yields and expansion of maize production, although at the expense of other crops (Chibwana 2011). Other evidence shows biases in subsidies, with farmers in Zambia who have a high predicted demand for hybrid maize seed and are poorer in land and income are not reached (Smale 2013).

With transfers and subsidies, targeting beneficiary populations is a significant challenge, especially with populations moving in and out of poverty. Poverty caused by 'shocks' can happen quickly and would need sensitive and frequent measurement in order to identify and support those falling into poverty (Carter 2004). Means-testing can be costly; community-based targeting, on the other hand, can be less costly but prone to poor ability to monitor and use information, variability in willingness to target the poor and risks of local-level corruption and rent-seeking (Haddad 1996; Conning 2000).

2.4 Entitlements may be a politically safer means of asset transfers to the poor (and non-poor) but are not widespread

Entitlements, which focus on vulnerability for specific population groups (covering equally those in chronic and transitory poverty as well as the 'never poor') have had some measure of success, including beyond the immediate beneficiaries, and may help defuse political, technical and organisational constraints facing poverty alleviation interventions (Samson 2009). Entitlements may vary by country but pensions, child grants/benefits, grants to child-headed households and girls' education tuition appear worthy of consideration. The argument has also been made for disability benefits (Gooding 2009). Free access to health care for pregnant women and children under five, as an entitlement, has gained some traction, leading to increased usage but not without issues regarding the quality of care and continued out-of-pocket expenses.¹⁹ Free education comes with higher enrollment but often

¹⁸ Developing countries are at a significant disadvantage in agricultural development, due to subsidised agriculture in developed countries which encourages overproduction and depresses world prices (see Wise 2004). Overproduction and price depression could also be a feature of poorly implemented subsidies in developing countries.

¹⁹ In Uganda, the general abolition of user fees improved access to health services and efficiency in utilisation, but out-of-pocket expenditures remained high mainly affecting poorer population quintiles (see Orem 2011). In Sierra Leone, abolition of fees for pregnant women and under-fives has led to increased consultations but State hospitals and health clinics across the country have been facing severe shortages of medicines that should be supplied under the free health programme because practitioners are diverting them for private sale, according to the Sierra Leone Anti-Corruption

poor quality, low learning achievements and also does not completely avoid out-of-pocket payments.

Social pensions, in a context of chronic poverty and mass unemployment, have been seen to inject income into pensioners' families and communities, enabling grandchildren to be educated and local trade to be stimulated (Devereux 2001). Child or family allowances, largely universal cash benefits provided to families with children, play an important role in reducing child poverty in European and OECD countries but are largely non-existent or paid at inadequate levels in developing countries (Gatenio-Gabel 2008). One example though is South Africa's Child Support Grant, implemented in 2003, which by 2008 had already reached 7.2 million children (Barrientos 2008). Universal transfers (entitlements) do remove one infamous poverty trap of cash transfers, whereby those who raise their income just above the threshold used to determine eligibility immediately lose all benefits (Standing 2008).

The assumption that the welfare of citizens, such as life expectancy, infant mortality, educational achievements and literacy rates, is influenced through public spending is not borne out by evidence where changes in public spending do not equate specifically to changes in welfare (Tanzi 2005). Vietnam's increased expenditure on safety nets, for example, was seen to have been spent on formal entitlement programmes that were failing to deliver substantial reductions in vulnerability for households classified as 'poor or hungry' (Fritzen 2003).

The State's role would appear to be best directed at ensuring infrastructural and institutional assets are readily available to the poor and in providing entitlements that enable vulnerable groups to better access the range of assets they need. The efficiency and effectiveness of services run by the State need to be questioned, given their generally poor quality and unreliability, plus the existence of grey areas of dual role playing by public service providers. Engaging private providers, with proper regulation and monitoring in place, could have significant quality gains and be competitive in terms of the use of out-of-pocket expenses, with financial assets bolstered by increased entitlements and cash transfers.

3 Changing environment for the poor

The dynamics of development have shifted in recent years, especially with a number of large population countries moving from low-income to middle-income status, and the growth in population numbers being almost exclusively in urban areas. The majority of the poor are trapped in geographically-concentrated areas, both urban and rural, of middle-income countries which receive insignificant amounts of international aid in relation to their economic situation. Inter-country cooperation is more aligned with business demands and relationships and common concerns, with increasing South-South cooperation. Community structures are changing, with urbanisation and increased access to mobile phone technologies. Philanthropy, both local and global, and social enterprises are increasingly evident in seeking to support solutions to poverty reduction.

3.1 Community dynamics are rapidly evolving

The nature of 'community' is seen to be rapidly changing in many cultures. In Africa, the extended family has been the primary locus of political obligation and moral imperative, and beyond the family, the most effective support institutions have tended to have a faith-based foundation or are self-organised groups. Demographic changes, productive land shortages

Commission (see <http://irinnews.org/Report/95896/SIERRA-LEONE-Drug-diversions-hamper-free-healthcare>, posted 18 July 2012).

and urbanisation though are causing this social fabric to rapidly evolve (Kelsall 2008). The degree of transience, crowding, insecurity and poor conditions in many urban settings can undermine cooperation and result in lower levels of reciprocity. Data from South Africa have already indicated that only around half of urban households have an affiliation with grassroots organisations, compared to nearly nine of ten rural households (Foster 2005). In Mexico, rapidly growing cities, intensive urbanisation and substantial migration have contributed to a society in which lack of trust is pervasive and community is largely limited to close-knit family circles (Berger 2009). An observation also comes from western societies where economic expansion has promoted individualism and low social integration (Hunout 2003).

Where social protection measures (mainly cash transfers) have been adopted, there are questions as to whether traditional help mechanisms have begun to be eroded as a result. Observations are mixed, with these mechanisms remaining strong in more remote communities, changing where transfer recipients receive less support from families, or complementary where recipients pass on benefits to non-household members (Wietler 2007; Flory 2011; Ellis 2012). An increased 'monetisation' of help is, nevertheless, emerging (e.g. selling instead of giving labour to neighbours) due to decreasing socialisation and the erosion of customary values and traditions. There is already evidence that mutual insurance initiatives tend to function in networks comprised of relatives and friends rather than in administrative (village) units (Dercon 2005). In India, there has been a gradual erosion of the traditional, community-based mechanisms which had provided poorer households with some form of safety net (Kabeer 2002); causes have not been related to social protection measures but to the commercialisation of agriculture, the emergence of labour surpluses and evolution in caste-based occupational structures.

3.2 Technology inroads are rapidly transforming development

Communication technologies are opening up societies in an accelerated fashion. The mobile phone has been described as the current generation's revolution, being truly global and not limited to any region or country, a catalyst for unprecedented global economic and social benefits, increasingly accessible to those who are marginalised and less advantaged (Samii 2009). In South Africa, the mobile phone is both reinforcing and redefining traditional ideas of identity and community with constant connectivity, inclusion into a larger, tech-savvy and modern world, and an increased focus on commoditisation and competition, creating a heightened awareness of individuality (Huston 2008).

Mobile phones, now ubiquitous in a majority of countries including in rural villages, are enabling messaging and data management in real time and radically changing access to information. The future of education in Africa is considered to be mobile with 'anywhere, anytime' learning, including schools which are already going digital (Vosloo 2012; *The Economist* 2012b). One caveat though is the fact that in 2010, 300 million fewer women than men in developing countries owned a mobile phone (Engelbrecht 2010). There will still be those amongst the poor who may not have access to mobile phones, even with sharing, thus risking increased inequality of opportunity and potentially a poverty trap in itself.

Data collection frameworks using mobile phones with data submission to and from central databases are widely applicable (Estrin 2007; Aanensen 2009). Mobile phones allow users to receive patient advice through text messaging (Zurovac 2012); enhance health worker performance in Kenya (Jones 2012); enable farmers in India through village knowledge centres to access latest information on commodity prices and other essential information (Stone 2010); improve follow up and promote health behavior change in a social franchise²⁰ in Uganda (Cleveland 2012). Furthermore, the increased introduction of affordable smart phones will significantly expand connectivity and applications (*The Economist* 2012c).

²⁰

www.livinggoods.org

In terms of mobile phone technology, an innovative method of tracking population movements through SIM card positioning has been used in post-emergency cases (Bengtsson 2011). *Ushahidi* (meaning 'witness' in Swahili) is already using crowd sourcing (or crowd mapping), with one of its early uses telling Kenyans where their help was most needed by those who had been driven from their homes in the political unrest in early 2008 (Jeffery 2011). Another platform, FrontlineSMS, is used by KOFAVIV, a local organisation started by rape victims in Haiti (MacDonald 2011).

Beyond information management, mobile money is being rapidly facilitated by the use of mobile phones; leading telecom operators across Africa, for example, are already providing mobile banking solutions. M-PESA in Kenya has become the most frequently used money transfer mechanism in the country (Lonie 2010). In the Democratic Republic of the Congo, CelPay recorded 500,000 transactions per month already in 2008 (Kopicki 2008). In the ten top countries, in percent of population using their mobile phones to send and receive money, the poor were the main users, with a higher percentage use by the bottom 40 per cent of income compared with the top 60 per cent (Goodsmith 2012). The introduction of mobile money transfer systems in many developing countries offers opportunities for a more cost-effective means of implementing cash transfers (Aker 2011).

3.3 Indigenous Philanthropy²¹ is emerging as a significant financial player in development

Help mechanisms are found in all communities and cultures, and encouraged by all major religions and traditions (Knight 2012). With an increasingly urbanised and communicated world, and the existence of more fragmented community structures in urban settings, it is less likely that traditional help mechanisms will be able to respond significantly to poverty traps. Meanwhile, the numbers of the ultra-wealthy have soared around the globe (Beddoes 2012); a more in-depth view of philanthropy, both indigenous and global, needs to be taken in terms of current and likely future resource flows. Indigenous philanthropy is increasing rapidly. One dimension relates to the diaspora,²² which in 2011 sent an estimated \$28 billion back to low income countries and \$344 million to middle income countries.²³ Another relates to in-country philanthropists (including companies' social responsibility actions). Philanthropy by rich Africans, is relatively widespread, as a rich person is looked upon scornfully if s/he does not (follow tradition and) put resources forward to help the development of the community (Otas 2012). There is potential for significant increases in indigenous philanthropy with the growing recognition that the concentration of wealth has increased inequality. Crowd-funding, as indicated above, is already making inroads into Africa. 'The question is the degree to which this philanthropy is over-localised (by community, ethnic group), whether there is an over-personalisation of or self-interest in the giving, ensuring visibility to the giver, or whether it can be channeled to enhance community philanthropy among the poor, building particularly the overall availability of physical assets that can help pull the poor out of their poverty traps?

The case for a healthy private philanthropic sector in every country is strong, as Governments are hard pressed to meet basic needs and the poor rely heavily on privately-funded services. Indigenous philanthropy can mobilise voluntary action which can be as important as funding, and can help offset the influence of external donors, using existing community skills to allow more people directly into the process (Gerhart 2000; Trust Africa 2009; Papeleras 2012). Even small funding can catalyse new ways of using finance – people

²¹ Indigenous philanthropy here is understood as any resource transfer of non-State origin that takes place within a country, vertically from rich to poor, horizontally from poor to poor (transfers among the same economic quintile, community or family), including diaspora transfers to family members.

²² The share of remittances received by those living in poverty varies considerably across countries (see: Acosta 2007).

²³ World Bank data (*Migration and Development Brief* 18, 23 April 2012)

have to think harder about what resources they can contribute, what additional support they can negotiate and who they can work with (Satterthwaite 2012). In addition, when local groups receive and allocate 'donor' money, modest funds can catalyse major results; what is needed are processes that let the poor choose their own options for development, as this attracts much more money from community savings, government and other sources (Mitlin 2012). The informal economy itself, for example, has been seen as having the potential for a much larger mobilisation of resources compared to the rationalisation of State expenditure (Jarrett 1995). In other words, there is a strong argument for developing a broad country-based 'giving infrastructure' tailored to the context of wide-scale poverty (poverty traps), respecting the insights, norms and modes of assistance used by the poor as protagonists in their own development, rather than as recipients of gifts (Wilkinson-Maposa 2005). The rise of social media also heightens the potential for far greater people-to-people giving (Rogerson 2012).

Community foundations, which are indigenous philanthropic grant-making institutions accumulating financial resources from a variety of contributors (including local individuals and companies, diaspora populations, government and international bodies) have been growing in a number of countries enabling local people and groups to respond to local challenges. In Africa, community foundations offer the potential to focus on outcomes related to social change, asset building, enhancing community capacity and developing policy, with an overall aim of strengthening local communities and building high levels of trust (Hodgson 2012). Examples include the Ikhala Trust of the Eastern Cape of South Africa, enhancing the capacities of problem-solving community based organisations, and the Makutano Community Development Association in Kenya, which supports 84 local self-governed community-based organisations (Project People 2006; Mahomed 2011). Similarly, Tewa in Nepal provides grants to women's groups, through funding from over 3,000 Nepali donors and some 300 Nepali institutional donors (Tewa 2011). Mexican community foundations seek to strengthen the civil sector, foster a culture of organised philanthropy and address the needs of vulnerable and low income populations (Berger 2009).

The increasing prominence of philanthropy is a significant shift in the development environment with potential for addressing poverty more comprehensively. The challenge is to create a balance in indigenous philanthropy between humanistic approaches (which are values and passion driven, opportunistic, bottom-up, qualitative and difficult to codify) and technocratic approaches (which are objective, dispassionate, rationalistic, top-down, quantitative and scientific), with clear strategies governing the process of giving (Connolly 2011). Emerging indigenous philanthropy could be strengthened with closer links to global philanthropy.

4 Complexity

This rapidly changing environment facing the poor merits a new way of analysing solutions to poverty with a context and locality-specific approach. Causation is complex and outcomes are determined not by single causes but multiple causes, and these causes usually interact in a non-additive fashion (Byrne 1998). Furthermore, an increasingly networked society clearly exhibits features of complexity, being a non-equilibrium structure which has emerged as a result of the developments in information technology (Prigogine 2000).

4.1 Traditional approaches are limited in their ability to address complex issues

The multidimensional nature of poverty presents big challenges for traditional approaches to poverty alleviation policies and programmes, inasmuch as the capacities to tackle complex problems are often distributed among actors, and are difficult to predict and often involve conflicting goals; thus, traditional tools often include inappropriate assumptions and controls and when applied can cause negative side effects and have counter-intuitive and unintended

consequences (Jones 2011; Helbing 2009b). Most State action and development aid tends to follow simplistic solutions with linear cause and effect, as national and international actors subscribe to specific goals and sectoral silos that often ignore the multidimensional framework of poverty traps. Worse, poverty traps can be perpetuated by sectoral traps and the mindsets that underlie them (Narayan 2008). Even sectoral silos in themselves, such as health systems, have been described as complex systems (Adam 2012). This would imply that there exist complex systems within a broader complex system of poverty.

Complexity science²⁴ can prove particularly useful in embracing what may be considered the 'messy realities' of poverty, allowing comparisons (or connections) between variables and systems and potentially strengthening insight and helping highlight possible effective actions (Ramalingam 2008). The properties of complex systems – non-linearity, emergence, self-organisation and co-evolution – determine that each system has a unique structure and evolutionary history creating a unique behavioural pattern which is contextual, adaptive and not fully predictable²⁵ (Morçöl 2012). Complexity implies that there is no one solution to any problem and not one discreet cause; a complexity approach is inherently theoretical, but solutions emerge in the relationship between ideas and the non-linear dynamics of social landscapes rather than in the ideas alone (Dennard 2008).²⁶ The importance of diversity and randomness in sustaining the capability for adaptive innovation has been shown through applying analysis based on complexity science (Coveney 1995). Thus, there is a growing need for specialisation to be supplemented by integration; no complex, non-linear system can be adequately described by dividing it up into subsystems (silos) as these subsystems interact with one another, and if studied separately, even with great care, do not put a useful picture of the whole when put together (Gell-Mann 1995).

Indeed, many of the problems, pertinent to poverty, are neither predictable nor simple, but unique and complex, arising from environments characterised by turbulence, and uncertainty, and typically value-laden, open-ended, multidimensional, ambiguous and unstable; as a result, a development professional needs to be skilled at managing complexity (Klein 2004). Also in this context, policy decisions need to be seen as temporary measures to be reviewed and adjusted on an ongoing basis (Richardson 2008).

4.2 Poor people behave as complex systems adapting rapidly to change

A central component of complexity science is self-organisation, which is the spontaneous emergence of order in a complex adaptive²⁷ system; one representation of self-organisation is a human network where a collection of individual agents, who have the freedom to act in unpredictable ways and whose actions are interconnected, produce system-wide patterns (Eoyang 2001, 2007). This concurs with observations that humans make decisions based on patterns, humans create and maintain multiple identities, humans ascribe intentionality and cause where none necessarily exist, and humans have learnt to structure their social interactions to create order (Snowden 2004). Complex adaptive systems are constantly revising and rearranging their basic building blocks based on the interaction amongst agents;

²⁴ Complexity science generally refers to the study of complex systems, which are common in nature, in social organisation and in technology, and are systems where the collective behavior of their parts entails emergence of properties that can hardly, if at all, be inferred from properties of the parts (see Ay 2011). Thus, complexity science introduces a new way to study regularities that differ from the traditional cause-effect relationships, positing simple causes for complex effects (see Phelan 2001). Of interest here is complexity as method (see Delgado 2004).

²⁵ This uniqueness and lack of predictability impose limitations on the extent to which knowledge is generalisable – and enhances the view that poverty is context specific and needs to be analysed in this light.

²⁶ One example is the UNICEF conceptual framework, which it reports the nutrition community has been using for programming for the past 25 years, and which identifies basic, underlying and immediate causes of maternal and under-nutrition – (www.unicef.org/nutrition/training/2.5/4.html); in practice, immediate causes are mostly targeted, which may be driven by the uncertainty of sufficient and sustainable resources and the need to show tangible results in a short time-framework.

²⁷ Complex systems by their nature are adaptive – this term though does accentuate the fact that agents (people) continuously adapt to their situation.

furthermore, such a system can have many levels of organisation, with agents at any one level serving as the building blocks for agents at a higher level (Waldrop 1993).

The argument here is that poor people address their ‘messy reality’ with a great deal of individual initiative, often supported by community or collective action, and this is closer to the functioning of complex adaptive systems than actions carried out by the State or its allies. The poor self-organise in family, community and/or network groups as they see fit, building the required relationships and adapting as necessary to solve their changing realities. An indigenous capacity for self-organisation is often quite rapidly revived even in countries where such initiatives were comprehensively crushed by the State, as has been seen in Somaliland (Kelsall 2008). In addition, in the presence of what can be quite severe development pressures, local organisations have a capacity to restructure (Warner 2001).

4.3 Complexity science has methods and tools that can help analyse the dynamics facing the poor

As is expected with new approaches, there is a long trail of methods, tools, techniques, models and languages pertaining to complexity science; tools include attractor determination, future search, network analysis, computer simulation and non-linear time series modeling (Eoyang 2004). Most relevant to analysing poverty traps and emergent properties may be simulation, in which systems are modeled in abstraction and then driven onwards through time to see what happens, and statistical modeling, which involves seeing what mathematical form will actually ‘fit’ available historical and time-ordered (longitudinal) data sets²⁸ (Byrne 1998). More specifically, agent-based modeling²⁹ is used in understanding systems composed of interacting agents and the emergent properties arising from the interaction of the agents that cannot be deduced simply by aggregating the properties of the agents.³⁰

In terms of human dynamics, simulation has been used in analysing ‘success-driven migration’, according to which individuals try to improve their expected overall payoff by occasional moves to other places, and showing that this ‘migration’ can be efficient in supporting cooperation (Helbing 2009a). Similarly, mathematical modeling has shown that one of the principles put forward for city growth is that socioeconomic outputs are proportional to the number of locally interacting people (Bettencourt 2012). The methods used in these examples can be useful references for establishing operational principles relevant to tackling poverty.

Empirical observational models using large-scale data analysis of mobile phone records are providing a better understanding of the emergence of social interaction and community structure in this type of social network (Jo 2011). In these networks, super-spreaders and super-receivers (super-users) of information emerge (as is predictable in a complex adaptive system) (Peruani 2011); this is also consistent with the self-organisation of ‘hubs’ in open source social networks that tend to dominate communication over peripheral individuals (Valverde 2006). More broadly, the use of a partitioning algorithm looking at large telephone data sets can yield geographically cohesive regions based on the ways that people interact across space and indicate potential spatial groupings or sub-groups of social networks (Ratti 2010). This research is showing the likely emergence of technology-based communities with specific spatial characteristics and leaders of the future communities.

²⁸ Household data sets and general system descriptor data sets for different social systems, both measured over time, can be used to examine the way in which changes in internal system structure (e.g. unemployment) are related to changes in whole systems parameters (e.g. social inequality) (see Byrne 1998).

²⁹ Agent-based simulations can generate emergent structure but in the real social world structure is the product not just of contemporary actions but of history (see Byrne 2005).

³⁰ **GAMA** is an example of a simulation platform, which aims at providing field experts, modellers, and computer scientists with a complete modelling and simulation development environment for building spatially explicit multi-agent simulations (www.ummisco.ird.fr/index.php).

A major part of inquiry into complex systems relates to selecting and representing stimuli and responses because the behaviours and strategies of the component agents are thereby determined (Holland 1995). In other words, if individual mobile phone users were to be recruited as agents, the question would be what will be their expected payoff, between altruism and incentives, for, say, cooperating in the identification and resourcing of poverty? Incentives will need to be positive to engage in action for which there is little or no pre-existing motivation or ethical obligation (Bowles 2008). Reciprocity, i.e. altruism in the expectation of indirect return, is among the most potent constructors of community-building ties in social networks (White 2008). The degree of reciprocity expected by users has to be carefully gauged, as cooperation is likely to be negatively affected the more reciprocity is expected (Hwang 2008).

4.4 Complexity science is beginning to appear in policy decision-making in certain specialised areas related to development

The relevance of complexity science to general development problems has gradually been taking hold. Timely or even urgent policy domains for which a complex systems approach could inform decision-making of policy makers so far include: medium-term weather prediction, long-term climate change, economic forecasting, environmental protection, energy security, the management of globally-distributed computing networks, the dynamics of social alienation and conflict, the design of financial regulatory systems, and the epidemiology of diseases (OECD 2009). These are seen as individual systems where analysis using complexity science tools and methods could be applied.

In the specific case of health, using complexity science has been indicated, using the example of the US Veterans Health Administration, for helping build interventions that improve health care delivery in primary care, especially in large health care networks, focusing on multiple interventions to improve non-linear processes (individualisation of processes) of care through both qualitative and quantitative assessment (Litaker 2006). The British National Health Service has assessed two hospitals with financial deficits and identified them as complex social systems which had been pushed far-from-equilibrium in the sense that they could no longer operate under their existing regime using established norms and procedures; through exploring their space of possibilities they created and continued to create new order, more comfortable with emergence, unpredictability and uncertainty and applying the distributive intelligence of all employees through active engagement (Mitleton-Kelly 2011).

Examples of the use of complexity science tools and methods related more specifically to poverty issues are at very initial stages. A future search methodology has been used to enable ECOWAS³¹ to be proactive in assessing the crisis landscape of its region, with a view to determining policies and strategies to achieve human security in West Africa. The study it commissioned looked at the longer term crisis drivers (26 in number), based on the key concepts of complexity and uncertainty, arriving in probabilistic terms about what appears to be most likely to happen based on past and current trends – from the perspectives of political security, community security, personal security, environmental security, food security, economic security and health security – using a methodology combining aspects of trends analysis and non-linear data projections, with more speculative imaginings of West Africa's future (HFP 2008). Observational analysis supported through numerical experiments with a coupled atmosphere-ocean model have shown the influence of the tropical South Atlantic on both monsoon rainfall and malaria epidemics in northwest India, and providing an early warning system for intervention and prevention (Cash 2013). Work is just starting on looking

³¹ Economic Community of West African States.

at ways to solve the problem of slums by using data that has been collected over time from nearly 7,000 slums globally and applying complexity analysis (Ruiz 2013).³²

Central to the questioning here is how to tackle the multidimensional factors making up poverty traps and applying a complexity analysis to them in any given locale and context. There is considerable data mining taking place in developing countries based on households, with a multitude of purposes and interests, both sectoral and multisectoral. These include censuses that periodically collect household data, multiple indicator cluster surveys (MICS)³³ and the similar demographic and health surveys (DHS)³⁴ that look at a significant number of indicators, sentinel site surveillance which tends to monitor a small set of indicators,³⁵ the Household Economy Approach which undertakes vulnerability assessments and analyses,³⁶ and others such as living standards measurement study surveys (LSMS) and household budget surveys.³⁷ The applicability of all these various sources of data for analysis using complexity science tools and methods has to be established; conversely, the need for complexity science to guide data mining on poverty has also to be established.

5 Which direction to tackle poverty?

The shift of global poverty towards specific urban and rural localities of middle-income countries will likely pave the way for addressing poverty reduction as primarily a domestic issue rather than primarily an aid and international issue³⁸ (Sumner 2012). Additionally, in terms of asset accumulation, particularly physical assets that increase the purchasing power of the poor, a long-term view suggests that by 2025 cash transfer systems will become the principal mode of providing assistance to poor people, with private philanthropies and social impact investors already innovating in scalable social welfare platforms and implying greater people-to-people transfers rather than intermediation through Governments; transfers building up individual and household physical and human assets (and boosting household enterprises) will foster more demand-driven development, with many of the goods and services purchased by the poor provided by the private sector (Kharas 2012).

This focus on middle-income countries and the poor as consumers aided by State entitlements and cash transfers from private sources changes the poverty landscape in upcoming decades. Stakeholder roles need to change to achieve this broad accumulation of assets by the poor and will require clear accountabilities and complementarity between the State and multiple private sector actors, and the poor themselves.

5.1 The poor need to be centre-stage in actions to tackle poverty

The poor are key actors, the most important resource and the most motivated to move out of poverty; they have a range of assets and capabilities that need to be built on and protected (Narayan 2008). In addition, individuals and communities may solve problems that both states and markets are ill-equipped to address, especially where the nature of the goods and services being transacted makes contracting highly incomplete or costly (Bowles 2000). It

³² This is a partnership between Slum Dwellers International and the Santa Fe Institute, New Mexico, supported by the Bill and Melinda Gates Foundation.

³³ www.unicef.org/statistics/index_24302.html

³⁴ www.measuredhs.com/

³⁵ One example covering a short period in 2010 relates to mortality and nutritional status in the Central African Republic (see Caleo 2012).

³⁶ Described in the Practitioners' Guide to the Household Economy Approach, compiled by the Food Economy Group and Save the Children as part of the southern Africa Regional Hunger and Vulnerability Programme.

³⁷ The UN has put together a review of household survey methods (see DESA 2005).

³⁸ It is assumed that international aid will continue to play an important role in supporting low-income countries' attempts at poverty alleviation and in humanitarian emergencies.

has been seen that most of the poor who move out of poverty do so at their own initiative. The poor need to be primary information providers to understanding poverty across a wide range of factors, and be centre-stage in the analysis and investment in solutions, through open-ended, culturally-sensitive discussions and interviews with individuals and community leaders that can add qualitative assessment to quantitative analysis based on diverse data sources. Emphasis has to be put on ensuring the availability of those assets most relevant for the poor to move out of poverty in each local context.

A key supposition here, given the change in community dynamics and the strength of technology inroads, is that technology-based communities will increasingly self-organise as well-structured human networks, with mobile phone users (e.g. super-users, and/or phone entrepreneurs)³⁹ able to take on the role of agents, working individually or in spatial groups and accountable for identifying and reaching those trapped in poverty to give them 'voice' and access to decision-making. How these technology-based communities self-organise and how motivation and incentives are incorporated will vary from locality to locality, but they can be linked to specific-purpose organisations such as private or community foundations, which act as an information and resource broker. Mobile phones have the great advantage of providing the continuous communication ability between people, which has been seen as central to sustaining the successful organisation of communities (Falkowski 2006). Consideration could be given to coopting agents that already exist and are using mobile phone applications, such as: community health workers in the field achieving health outcomes (Haines 2007; Bhutta 2011); trained community knowledge workers in Uganda helping neighbouring farmers with information to improve productivity (Edelstein 2012); the close to 30,000 agents in Kenya managing mobile money (Safaricom 2011); or phone entrepreneurs. The precise topology of interactions between agents though has important implications for the efficiency and effectiveness of collective learning processes (Frenken 2006). It is assumed that civil society organisations already emerging as social networks based on the instant interconnectivity of mobile phones will come to the fore in citizen participation.

5.2 The multidimensional and local nature of poverty requires a multidisciplinary approach to poverty reduction

Poverty functions across a potentially large number of factors related to health, education, finances and the environment. Each poverty situation may have different factors that prevail, so general or sectoral approaches can only respond partially to reducing poverty, if at all, in the absence of a comprehensive, interdisciplinary approach. The multidimensional framework of poverty can only be assessed and evaluated locally, given variance, for example, in access to physical, human, infrastructural and institutional assets. This means that interdisciplinary micro-planning is called for in order to secure both the right solutions, as well as the buy-in from the poor themselves.

The challenge here is that both State and aid sectors are largely organised on sectoral lines, so any significant effort at poverty reduction would require the intervention of leaders who can go beyond sectors to establish an interdisciplinary approach. Local district and urban governments become important stakeholders in this effort given the localisation of poverty.

This essentially leads to the need for the State at its various levels and the private sector, which includes philanthropy and corporate social responsibility entities, to agree on long-term sustainable cooperation for addressing poverty. Ultimately, complementarity in State investment and private sector action needs to come into play, including both asset accumulation and entitlements.

³⁹ Individuals who have set up household enterprises based on selling phone air time to neighbours.

Maintaining coalitions for change based on solidarity – and engaging citizens as well as government sectors – will be an important part of the solution to poverty reduction in the context of inclusive and sustainable development (Norton 2012). Each society will have its particular set of parameters that capture the degree of cooperation and these parameters will be profoundly determined by the cultural background (Lozada 2011). In the context of collective action, both global and local features are likely to be relevant to achieve success in both large-scale collective action and small-scale cooperation (Cardenas 2012). Coalitions must, however, be formed at the level of poverty traps and derive solutions from that level.

There is certainly a cost to be borne through maintaining vibrant coalitions, but it has been shown that strong reciprocity and other social preferences that support cooperation can evolve and persist even when there are many ‘self-regarding’ players, where group sizes are substantial and when behavioural or perception errors are significant (Bowles 2007). Group size can increase the probability of a critical mass of people who develop common goods through collective or cooperative action (White 2008). Furthermore, it has been demonstrated that more complex problems can be solved with larger numbers of contributing individuals (Johnson 1998). Inclusiveness of stakeholders, including the poor themselves, needs to be a guiding principle of poverty reduction.

5.3 The full range of stakeholders needs to be identified and their roles and accountabilities established

The principal notion here, with the poor at centre-stage, is that they are able to secure the broad range of assets they need to enhance their own initiatives, minimise risks and secure a sustainable path out of poverty.

Citizens, both the poor and the non-poor, have intimate knowledge of patterns and anomalies in their environment; the ability to respond (or participate) is both empowering and valuable to research and planning (Burke 2006).⁴⁰ Moreover, the successful identification and reaching of the poor requires information on vulnerability, which has to be collected locally (Sparrow 2008). The very nature of mobile phone users’ mobility and access could allow individuals (as agents) to collect, analyse and transmit information and patterns important to them in their daily lives, or to entire communities (Shilton 2009; Cimonis 2011). Companies are already using such a real-time experience tracking approach with a consumer panel sending text messages to record ‘touchpoints’ with the company (Macdonald 2011).

A strong role for the State, supported by its inter-governmental allies, is necessary to ensure the availability of human, infrastructural and institutional assets that enhance equality (such as, road and transport infrastructure, access to markets and information, access to water, sanitation and public health and education services, backed by regulation and gap-financing), as well as selected transfers to specific populations through entitlements. The State also needs to address demand issues, building local capabilities through messaging, education, positive deviance approaches⁴¹ and other educational channels, guiding the poor to secure and make best use of available assets.⁴² There is a strong implication that the State should be a funder and regulator and not a direct service provider, as its direct management of

⁴⁰ The ‘Neighbourhood Method’ applies this same understanding to child protection in crises, particularly on gender-related violence, though assuming that people have knowledge of their neighbours’ situation (see: www.cpcnetwork.org/learning-details.php?ID=1)

⁴¹ *Positive deviance approaches* are increasingly successful actions based on the observation that in every community there are certain individuals or groups whose ‘uncommon’ behaviours and strategies enable them to find better solutions to problems than their peers while having access to the same resources and facing similar or worse challenges; actions are undertaken to promote the adoption of these behaviours and strategies across the whole community (see: www.positivedeviance.org).

⁴² *Facts for Life*, for example, provide vital messages and information for mothers, fathers, other family members, caregivers and communities to use in changing behaviours and practices (see: www.factsforlifeglobal.org).

infrastructure and services has historically been deficient and a main reason for the poor to rely more on the private sector, except in cases of emergencies or destitution.

The private for-profit and not-for-profit sector should in many instances be the principal provider of human and infrastructural assets, given the significant reliance the poor already have on this sector. The private sector should be contracted as necessary by the State, or paid through out-of-pocket payments facilitated by State entitlements or other transfers available to the poor. Insurance mechanisms will be increasingly attractive to the poor, to enhance their access to specific assets and manage risks.

Mobile service providers play a central role in the changing environment for the poor, including the emergence of technology-based communities. This role would be in line with views that consider one of the most important and enlightened investments by the private sector as part of its corporate social responsibility can be to finance and support the emergence of strong, autonomous federated networks of poor people who can become able business partners (entrepreneurs) over time or corporations of the poor (Narayan 2008: Pínglé 2008). Their role is not just providing a means to reach clients with messages and information or to use mobile phones to receive reports, but acting as a development channel that can foster community identity and affinity for collective action, mobilise selected clients as agents and provide a channel for indigenous philanthropy. They will need to differentiate between their business and social responsibility arms in the dual role of providing services and supporting philanthropy, in order to avoid potential conflicts of interest. The Vodafone Foundation ambassadorial network in Tanzania helping find and refer women with obstetric fistula would appear to be one example of a mobile community in action backed by the service provider.⁴³

The role of philanthropy, including corporate social responsibility, is gaining momentum in developing countries and will play an increasingly important role in addressing poverty. Integrating horizontal (poor-to-poor) and vertical (rich-to-poor) philanthropy in countries would increase above all the physical assets available to the poor. The diaspora is already a significant force in transfers, and may be already sustaining families out of poverty; its role in the building of infrastructural assets available to the poor needs to be carefully assessed in each context and strengthened. Community foundations, linked to foundations formed by philanthropists and corporations, may be a means to support agents and channel resources to the poor. International foundations, themselves with a philanthropic base, have the best potential to enhance and support indigenous philanthropy, through funding and technical resources; a lot of their current emphasis on supporting State intervention would appear a less effective means to address poverty, as compared to helping indigenous philanthropy with their own initiatives to help the poor move out of poverty.

The engagement of researchers from complexity research institutions would provide critical insights to emergent patterns, both in support of civil society and the State, selecting the tools and methods most appropriate to the nature of poverty traps and the human dynamics that occur. There are an increasing number of research institutions focused on complexity science and its applicability to policy development.

5.4 Complexity science can play a strong role in policy analysis and strategy development related to poverty

Social, political, ecological and economic systems involve mutually adaptive interactions and produce characteristic patterns; the promise of complexity science for policy applications is, at its core, the hope that science can help anticipate and understand these key patterns in

⁴³ www.vodafone.com/content/index/about/foundation/mobiles_for_good/ccbrt.html

complex systems that involve or concern humans, thus enabling wiser decisions about policy interventions (OECD 2009).

Strengthening the poor's ability to self-organise, adapt and restructure in addressing the multidimensional framework of poverty can be greatly enhanced by using a complex systems' perspective that seeks emergence of patterns favourable to moving out of poverty. At the same time, the State needs to adopt the relevant complexity science tools and methods to better direct its pro-poor policies and interventions.

The application of complexity science tools and methods that have been developed could be instrumental in putting a new dynamic on poverty alleviation, including:

- Understanding the dominant factors and key connections in the multidimensional nature of specific poverty traps, the patterns in the poor's coping and help mechanisms, and the relevance and appropriateness of State and private sector intervention, using modeling and simulation to identify probable emergent solutions to poverty;
- Mapping community dynamics of self-organisation, the emergence of technology-based communities and agent identification and motivation, using network analysis and human behavior modeling to determine the interconnectedness among competition and cooperation in these emerging communities, and the incentive drivers;
- Tracking multiple sources of asset accumulation and use, using algorithms to analyse large and diverse data sets.

The applicability of complexity science tools and methods to addressing poverty traps needs to be tested. While there are indications that complexity science tools and methods can play an important role in analysing the multidimensional nature of poverty, there are no easily-identifiable examples showing their successful application to specific poverty traps. A great deal of familiarisation is required, of complexity science experts about poverty, and stakeholders in poverty reduction about the potential benefits of complexity science. This familiarisation process would be a first step, preferably in specific localities where all stakeholders could bring their perspective to the 'table'.

A serious review of existing data from all sources, both public and private, including census, routine reporting, monitoring, surveillance and surveys, will be needed to determine the extent to which complexity science tools and methods can be engaged, or new ones devised, given the need for longitudinal data (history), and the importance of initial conditions and identifiable change patterns. Challenges will be the very messy realities of poverty where transience and insecurity can hinder systematic data collection, as well as the poor's own participation in information sharing and analysis. Nevertheless, interviewing the poor to gain their perspectives on asset availability and subjective wellbeing indicators will be essential.

Country mobile phone service companies become an important ally for data management, inasmuch as they hold significant data for analysis, around patterns of behavior of their customers, including the identification of emergent communities and leaders.

Conclusion

The poor address the multifaceted situation (messy reality) facing them with a logic determined by assets available to them while considering best value and least risk in the solutions taken. They depend to a significant extent on infrastructural assets provided by the private sector due to the easier access, the higher perceived quality of service they receive and the greater choice and control they can have. It is essential that all stakeholders addressing poverty work collaboratively to assess closely the situation faced by the poor, which at any instance may be ill health, school expenses, insecurity, illegality of abode, unaffordable hybrid seeds and fertiliser, or any other of the many factors which in combination cause immense difficulty in their exit from poverty traps. These factors may vary considerably from location to location and the poor themselves need to provide factors to be taken into account. Analytically, an approach using complexity science can inform State sectors, private sector actors and fund holders as to the emergent properties from the many prevailing factors and propose the actions to be given priority in any given locality, with further detailed assessment incorporating sectoral analyses as needed.

Rather than subscribe to the notion that the State should be directly providing infrastructural assets for the poor and which it has largely failed in doing to date for a variety of reasons, it would seem more relevant to talk of how to enhance the poor's access to private sector infrastructural assets. The State, however, cannot abscond from its responsibilities, but would do better setting, promoting and monitoring pro-poor policies and standards, financing infrastructural assets where needed and investing in enhancing institutional assets. A key intervention of the State would be the implementation of entitlements of a sufficiently significant amount to particularly vulnerable population groups, such as the aged, under-fives, pregnant women, adolescent girls, orphans and the disabled. Complementary to this, and relevant to building human assets, would be effective public education and communication on the options available to the poor in accessing assets, and the poor's responsibility in terms of contributing to the wider society, by, for example, ensuring their children are vaccinated and complete the required years of schooling.

The two features to watch closely in the changing development environment are mobile phones and philanthropy, notably indigenous philanthropy including the diaspora. Mobile phones not only increase the poor's instant access to needed information but can also facilitate cash transfers. Mobile phone systems will increasingly provide the large data sets needed to continuously identify emerging and adapting human behaviour behind the actions taken by the poor and new networks of (community) leaders. Developing country (indigenous) philanthropists, buoyed by new wealth as well as the growing face of inequality, are increasingly visible and can play a vital role in focusing on poverty (rather than technocratic technical interventions), enhancing especially the poor's physical assets.

There are potentially numerous research areas implicit in these conclusions, but of note would be:

- The overall impact of indigenous and global philanthropy, including the diaspora and community foundations, on poverty reduction;
- The coverage and impact on poverty of entitlements to specific population groups, and their sufficiency in terms of duration and value;
- The degree of access and influence on the poor of private for-profit and not-for-profit asset providers, and the potential for expansion and improved affordability;
- The determination of which complexity science methods, tools, techniques and models would lend most appropriately to analysing poverty traps, and the ensuing data requirements and current gaps;
- The use of mobile phone data sets to determine community emergence and agent identification;

- The organisation of State entities and their inter-governmental allies, to effectively engage in addressing the multidimensional nature of poverty, with a specific focus on the lowest administrative levels where direct engagement with the poor can occur.

In addition to ongoing research, the actual testing of methodologies in localities in both urban and rural areas identified as poverty foci could be invaluable.⁴⁴ This would show the feasibility of participation by the poor in the identification of the factors most significant in their poverty, determine the methods to secure relevant information and evaluate what data already exist and what gaps need to be addressed, conduct an inventory of existing physical, human, infrastructural and institutional assets among the public and private sectors and the level of household assets that exist, and run simulations to ascertain emerging priorities to reduce poverty.

A final word is that poverty can no longer be the domain of sectoral silos working in isolation but rather become the interdisciplinary pursuit of answers to the complex multidimensional problems faced by the poor, with the involvement of all stakeholders, public and private, with the poor themselves at the centre of design and implementation.

⁴⁴ The number and nature of localities would depend on resource availability and the interest of authorities and other stakeholders in committing to this work.

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