PRACTICAL ACTION
Technology challenging poverty

Wellbeing, Technology Justice, And Sustainable Development

Fighting poverty as if people really mattered

Contents

1 Foreword

As a medium sized international NGO focussed on technology and development we can bring to bear the resources we have to make a big difference in the lives of many people, but we can't change the whole world on our own. That said, if we have a sense of what we think a different and better world should look like, we can ensure that everything we do works towards making that different world more, rather than less, possible. We can use that vision to condition everything we do - who we raise money from, who we partner, which opportunities we take on and which we reject. We can also use it as a framework or underpinning to ensure there is an overall coherence in the policy lessons we seek to communicate from our analysis of our own work and that of others – our day to day language about how we want to see things change.

One thing we have to be clear about is whether our mission is to complement the current model of global economic development or to challenge it. Is our role to provide some sort of safety net for those who fall through the cracks of a basically sound system which just needs some minor adjustments? Or is it to point the way to an entirely different approach, because we believe the current system is fundamentally flawed and unsustainable? Our founder, Schumacher, was in no doubt it was the latter and that is still what Practical Action believes today.

In 1973, when *Small is Beautiful* was written and the Intermediate Technology Development Group (ITDG)[i] was in its infancy, that book would have been seen as providing the overarching philosophy which guided the way the organisation thought and worked. People like George McRobie, one of the early staff, would have been able to see where ITDG fitted in and contributed to that analysis of how the world could be a different and better place, even though the book itself was much more wide ranging than ITDG's own relatively narrow mission of working on appropriate technology (a subject which only really occupied chapters 10 -14 of a 19 chapter book). Times have moved on since Schumacher published *Small is Beautiful* and it is clear that some of his ideas (e.g. the role of women in the work force) now look both dated and unacceptable. So what is that overarching philosophy now?

At the core of Schumacher's 'Small is Beautiful' was both a warning – that our insatiable appetite for an ever-expanding consumer lifestyle was unsustainable – and the offer of an alternative solution – a path out of that ecological dead end achieved through refocusing development, technology and economics away from consumerism and on to what really makes people happy. In this document we argue that these elements of Schumacher's thinking still have a huge resonance with the great dilemma the world now faces – how to end the global injustice of poverty whilst ensuring a sustainable future for everyone on this planet. We argue that the concept of 'sustainable wellbeing' should be the goal of development and macro economic policy. We also argue that it is our systems of governance and the technologies that we develop through these systems that will determine ultimately whether we achieve 'sustainable wellbeing' for all or

[i] ITDG changed its working name to Practical Action in 2005.

whether we continue on our current course towards self inflicted disaster and offer a principle of 'technology justice' (not dissimilar to Schumacher's idea of 'technology with a human face') as a guide towards technological innovation that will push us towards the former rather than the latter. These concepts of 'sustainable wellbeing' and 'technology justice' provide for Practical Action both a narrative to describe our current vision of the world we are striving for and a framework for the way we structure our work and our contribution towards achieving that world.

In its current form, this document is first and foremost for an internal audience of Practical Action staff and trustees. Its aim is to stimulate discussion and to move towards a shared vision of how we as an organisation see the world, the need for change, and our role in that change. It starts by looking at how relevant Schumacher's ideas concerning the limits to growth are to today's world, before going on to examine the role technology plays in development and why technology doesn't always work for the poor at the moment. The subsequent section then looks at what the overarching purpose of development should be and how a different approach to both economics and technology might support that purpose. The final sections then look at how concepts of 'right livelihoods', 'technology with a human face' and 'active citizenship and responsive governance' provide guidance to the way Practical Action works and how this contributes to establishing an alternative path to global sustainability as well as poverty reduction.

Conventional Wisdom – the current development narrative and why it doesn't work

2 A critique of current practice – setting the scene

Conventional wisdom, or at least conventional practice, defines development in terms of rising incomes and higher consumption levels, supported and facilitated by technological progress and ever greater levels of efficiency in terms of use of resources.

In academic circles and in official policy rhetoric there has been recognition for some years that things are far more complex than this simple analysis. But as the following two chapters will show, in reality macro economic and development practice remain driven by relatively simple and out-dated notions of consumptive growth and technology driven modernisation, which are not delivering improvements in the quality of life anywhere near fast enough for the 2 billion plus people in this world who live on less than $2 per day.

In exploring the notion of economic growth in chapter 3, we will show that the current economic systems and practices are not only failing to distribute economic benefits in a just and equitable manner, but also pushing us to the edge of the carrying capacity of our planet and endangering our ability to carve out a sustainable future.

In looking at the role technology plays in development in chapter 4 we will explain why technology is critical to the fight against poverty but also unpick the numerous reasons why technology doesn't always deliver the benefits expected, or innovation happen in the areas of greatest need. In doing this we will show how technology innovation is not neutral, but the subject to contests of power between competing interests and how good governance and the participation of poor women and men in decisions about development are critical factors in the fight against poverty.

3 The limitations of economic growth as a strategy for eliminating poverty and providing for a sustainable future for all.

3.1 Introduction

Schumacher started off *Small is Beautiful* with the argument that the traditional discourse on economics is fundamentally flawed, based as it is on the idea that development is synonymous with perpetual economic growth which, in turn, relies on ever increasing consumption of material resources. He introduced the concept of 'natural capital', talked about the finiteness of natural resources, and used the field of energy to demonstrate how the consumption patterns of Europe and North America could never be replicated on a global scale. His conclusion was that humanity was on a collision course with nature and needed to take action quickly.

In a surprisingly short time – just 37 years after *Small is Beautiful* was published - we seem to be on the cusp of that collision. What got us here in the end wasn't quite the exhaustion of resources that Schumacher envisioned – climate change indicates that we've managed to choke ourselves on the pollution arising from the burning of fossil fuels before the fuels themselves have actually run out. But we are now faced with incontrovertible evidence that Schumacher's warning was right – humanity cannot continue to exist on an economic model that prioritises ever increasing consumption over everything else.

This section reviews the limits to the growth system of economics the world has followed for the last half century or so. It argues that the growth model as currently practiced is not sustainable and that, at least in the developed world, is also not delivering any discernable improvements in wellbeing (which must be the ultimate purpose of economic development). It argues that we have to move towards a different economic driver globally if we are to have a sustainable future, and that this alternative approach need not be detrimental to our future sense of wellbeing.

Given the levels of poverty in the developing world[ii], it is the developed world that will have to wean itself off growth first, allowing the poorer nations some room still to grow their economies to the level that could provide a reasonable standard of living for their citizens (although it is argued that even here different strategies are needed than those followed to date if that growth is to benefit the poor).

[ii] For the purpose of this document 'developing country' is taken to mean any country containing a substantial population living on less than $2 per day. As such this includes many emerging 'middle income countries' such as India and many from Latin America, as well as lower income countries such as Bangladesh or Malawi and states in conflict such as Sudan or Somalia.

3.2 Growth, prosperity and global economic stability[1].

3.2.1 Growth and stability

For the past 50 years the pursuit of growth has arguably been the single most important economic policy goal across the world, with the global economy now almost 5 times the size it was in the 1960's. The management of modern market economies, heavily influenced by neo-classical economic theory, has placed a huge emphasis on the productivity of capital and labour. Continuous improvements in technology mean that a unit of goods can be produced with an ever declining amount of labour input. This produces cheaper goods, but also a decline in the demand for labour which can only be offset if the economy expands fast enough to offer new employment opportunities. If the economy doesn't grow there is a downward spiral which starts with people losing their jobs and ends in recession.

Our current economic model therefore needs continuous growth to provide stability. But, as many commentators have pointed out, if the developed nations' economies continue to grow as they have over the past 50 years, and if the developing nations also seek to attain similar standards of living, then we will exceed the ecological carrying capacity of the planet in the not too distant future. The World Wildlife Fund, for example, estimates that if everyone in the world consumed natural resources and generated carbon dioxide at the rate we do in the UK today, we'd need three planets – not just one – to support us[2].

The conventional response to this dilemma is that technological progress will allow us to decouple economic growth from resource use, so that growth continues to occur, but with ever greater efficiency and using ever declining material throughput. Some evidence of relative decoupling can be seen – global carbon intensity fell over the last 30 years from 1kg per $1 of economic activity to 770g per $1. However, this relative improvement has been more than offset by increases in the scale of global economic activity over the same period, leading to total global carbon emissions increasing by 40% in the last 20 years alone. As Professor Tim Jackson, Economics Commissioner for the UK Government's independent watchdog the Sustainable Development Commission concludes, *"The scale of improvement required is daunting. In a world of 9 billion people, all aspiring to a level of income commensurate with 2% growth on the average EU income today, carbon intensities (for example) would have to fall by over 11% per year to stabilise the climate – 16 times faster than it has done since 1990….. In this context, simplistic assumptions that capitalism's propensity for efficiency will allow us to stabilise the climate and protect against resource scarcity are nothing short of delusional.[3]"*

An alternative argument for continuing to assume that perpetual economic growth is feasible is to posit that, in addition to the efficiency-based decoupling mentioned above there will also be a progressive shift in people's consumption patterns, away from 'physical' resource-intensive products to more intangible products with less or no resource implications. Economic growth based on financial services or the trading of information is sometimes cited as an example. In reality however, as Herman Daly the former Senior Economist of the Environment Department of the World Bank remarks: "…*sectors of the economy generally thought to be more qualitative, such as information technology, turn out on closer inspection to have a substantial physical base, including a number of toxic*

metals" … and …. "*even the providers of information services spend most of their income on cars, houses and trips, rather than the immaterial product of other symbol manipulators*"[4].

It is of course difficult to rule out categorically the possibility that, at some point in the future, a paradigm-changing technological breakthrough might challenge the above arguments. As Schumacher wryly noted in Small is Beautiful: "*..it is always possible to dismiss even the most threatening problems with the suggestion that something will turn up*"[5]. However, like Schumacher, Practical Action believes that, on the basis of what we know now about a growing world population, current resource use and the potential for future improvements in efficiency of production, it does not make sense to hold off taking action on the very faint chance that such a breakthrough might happen. Practical Action's own research has shown that climate change is already having an adverse affect on poor women and men in the developing world[6] and there is a moral as well as a practical imperative for action now. In short, from a sustainability perspective, the world needs to proceed now on the assumption that making continued and perpetual growth of consumption and GDP the focus of economic policy is not compatible with a sustainable and equitable future for the 9 billion people who are expected to inhabit this earth by 2050.

3.2.2 Growth and wellbeing

In addition to delivering economic stability, growth is also expected to deliver improved levels of prosperity or wellbeing. But in the developed world it is not clear that this is being achieved either. Life satisfaction in the most advanced economies has remained more or less static for the past few decades, despite significant economic growth. Real income per capita has tripled since the 1950s in the USA, but the percentage of people reporting themselves very happy in national surveys has barely increased. In the UK real incomes have doubled since 1957, but the percentage of people reporting themselves as very happy has declined from 52% then to 36% today[7].

Figure 1 to the right comes from a New York Times article published on the 3rd October 2005, based on research by Ronald Inglehart, a political scientist at the University of

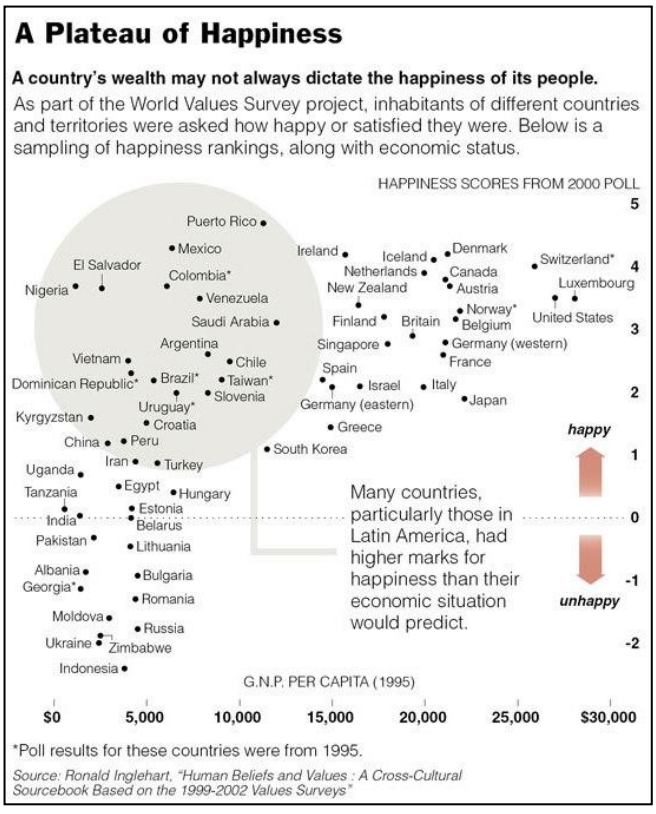


Figure 1: Reported happiness vs income

Michigan and the director of the World Values Survey[iii]. It shows that reported happiness increases quite dramatically for increases in GNP up to around $10,000 to $15,000 per capita, but that increases in GNP beyond that do not appear to significantly increase people's sense of wellbeing. Although happiness is clearly a subjective matter, very similar shaped curves can be found in life expectancy at birth vs annual income

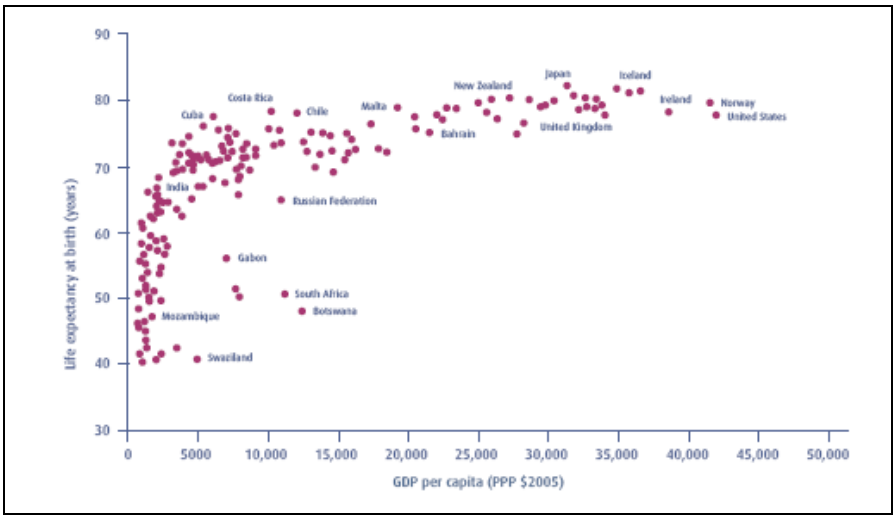


Figure 2: Life expectancy at birth vs average annual income per capita

and participation in education vs annual income, for example as figures 2 and 3, taken from the UK Government's Sustainable Development Commission's report 'Prosperity Without Growth'[8], show.

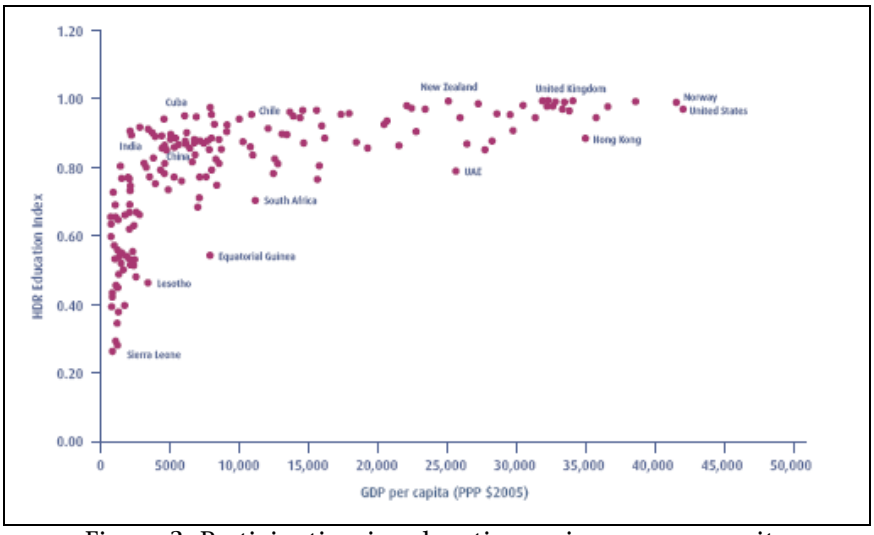


Figure 3: Participation in education vs income per capita

Again, according to this data, the majority of the increases in benefits come as average national per capita annual incomes move up from $0 to around $15,000 per annum, with only marginal increases in benefit being seen thereafter.

[iii] The World Values Survey (WVS) is a worldwide network of social scientists studying changing values and their impact on social and political life. Started in 1981 in collaboration with EVS (European Values Study) it has grown to include representative national surveys in 97 societies containing almost 90 percent of the world's population.

As a final example, if the UNDP Human Development Index (effectively a combination of the above two) is taken as a measure of wellbeing and energy use (as opposed to GDP per capita) as a measure of consumption, again the same shaped curve appears with the same countries in roughly the same locations, as can be seen in figure 4 below.

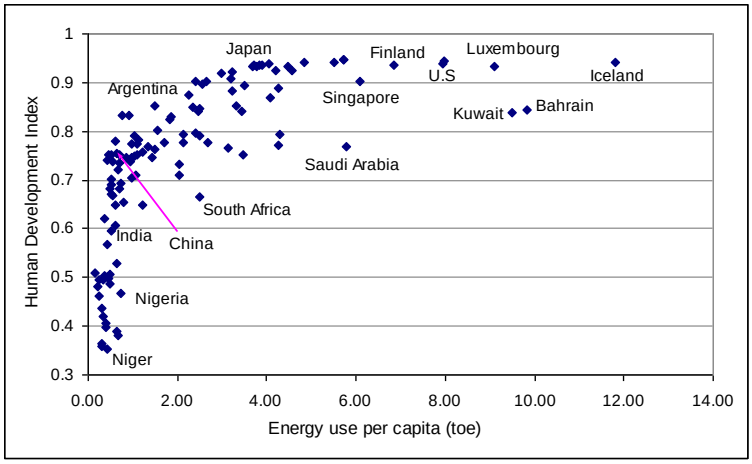


Figure 4: HDI vs energy use per capita[9]

In short, whether you measure human wellbeing in terms of happiness, life expectancy, educational attainment, or HDI score and whether you measure consumption in terms of expenditure or energy use, it is clear that there is a limit beyond which, even for significant increases in consumption, very little further improvement in wellbeing occurs.

We will look again at ideas of wellbeing and happiness later in this report, but one of the criticisms of using reported happiness survey data as an indicator of wellbeing has been that it may compress the apparent gap between poor and rich countries by ignoring greater longevity in the developed world. As Neil Thin, an anthropologist at Edinburgh University specialising in the study of happiness remarks[10]: *"Suppose the poor in our comparison score an average of 6 on a 10 point …*(reported happiness)*… scale and the rich score 7, this may not look like much of a difference until we note that the rich get an extra 10 years of life"*. This very valid point is addressed by an increasingly popular alternative measure developed by the distinguished Dutch academic Prof. Ruut Veenhoven[11] to take account of this combines life expectancy with reported happiness scores to produce an index of happy life years.

This approach has been adopted by NEF (the New Economics Foundation)[12], who have incorporated the notion of happy life years into a 'Happy Planet Index' which can be summarised as:

$$HPI = \frac{\text{(reported) Life Satisfaction X Life expectancy}}{\text{Ecological Footprint}}$$

The index attempts to measure the ecological efficiency with which different nations deliver human wellbeing and is offered as an alternative to GDP. Ranking countries according to their HPI score as opposed to their GDP provides an interesting contrast, with the UK and the USA performing very poorly on HPI (ranking 108th and 150th out of 172 nations respectively). This confirms the

picture painted by New York Times article and the Commission for Sustainable Development's report referred to above, namely that the OECD nations are inefficient in delivering wellbeing to their citizens (in that they use a disproportionately large amount of resources to deliver a very marginal increase in wellbeing compared to less wealthy countries).

Figure 5 chart taken from NEF's 2009 report 'The (un)Happy Planet Index 2.0' plots the numerator against the denominator of the HPI index for the 143 different countries for which data exists. The green zone in the top left hand corner of the chart represents an HPI at which a high level of wellbeing is delivered using an ecologically sustainable flow of resources; our ultimate goal. It also shows how far away most nations are, rich and poor alike, from the 'green zone' on the diagram (Costa Rica being the only nation in the survey to make it firmly into the green zone).

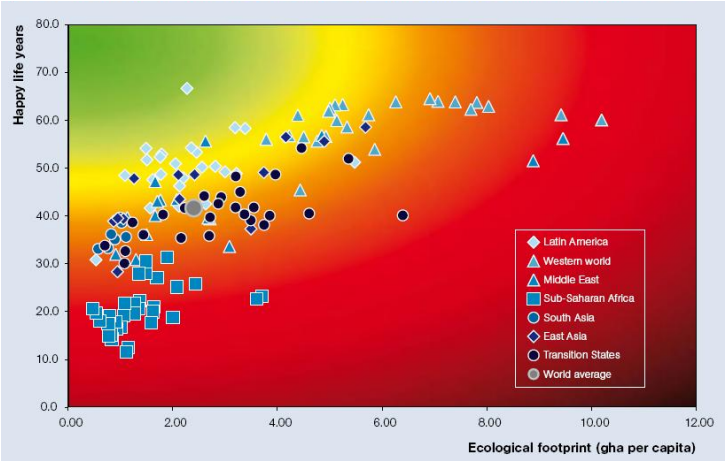


Figure 5: The green target. Happy life years and ecological footprint for 143 countries, and world average

3.2.3 Growth and consumerism

Disturbingly, despite all of the above evidence, we continue to live in a society predicated on the idea that increasing the consumption of material goods leads to greater happiness. Consumerism goes beyond a set of economic policies that place an emphasis on consumption in the belief that the free choice of consumers should dictate the economic structure of a society. It is, as the on-line encyclopedia Wikipedia suggests: "a social and economic order that is based on the systematic creation and fostering of a desire to purchase goods or services in ever greater amounts"[13].

Recognising the existence and understanding the nature of this desire is essential, as it has a direct connection to growth. The UK's Sustainable Development Commission links the consumer's desire directly to the symbolic role that material goods play in our lives[14]. *"The 'language of goods' allows us to communicate with each other – most obviously about social status, but also about identity, social affiliation, and even – through giving and receiving gifts for example – about our feelings for each other."* The Commission notes that in order to maintain this desire to consume, manufacturers need to continually produce novelty. "*Novelty plays an absolutely central role here for a variety of reasons. In particular, novelty has always carried important information about status. But it also allows us to explore our aspirations for ourselves and our family, and our dreams of the good life. Perhaps the most telling point of all is the almost perfect fit between the continual production of novelty by firms and the continuous consumption of novelty in households. The restless desire of the consumer is the perfect complement for the*

restless innovation of the entrepreneur. Taken together these two self-reinforcing processes are exactly what is needed to drive growth forwards".

But consumerism is not just a principle part of the reason why our economies are hooked to on the idea of perpetual growth. It is also a reason why technology innovation is largely focused on human 'wants' rather than human 'needs'; why, as Bill Gates has noted, more money is spent on finding a cure for male baldness than a vaccine for malaria[15]. We will return to this idea again in section 4.4.2 when we look at the barriers that prevent technology innovation from working in the interests of the poor.

The link between growth and consumerism means that the scale of the challenge in finding an alternative to growth as the driver of our economies and our development is huge. It is also clearly a political and a moral challenge rather than a technical one. In the annual BBC Reith lectures in 2009, Michael Sandel, political philosopher and Professor of Government at Harvard University argued that the recent global financial crises shows we need to think again about what are the moral limits to markets, but that we can't do this though until we stop seeing ourselves as consumers (with fixed preferences that just have to be met by the market) and instead behave as active citizens (with the capacity to understand the moral choices facing us and the ability to act)[16]. Sandel's call for a new 'politics of the common good' where, as active citizens, we try to change our personal preferences so they are in the interest of the greater good rather than pursuing self interest alone echoes Schumacher's call four decades earlier for us to begin to disarm greed and envy "*by being much less greedy and envious ourselves; perhaps by resisting the temptation of letting our luxuries become needs; and perhaps by even scrutinising our needs to see if they cannot be simplified and reduced…"*[17]

3.2.4 Unhappy and unstable?

In short, the above analysis leaves us with a number of dilemmas. The modern market based economy is absolutely dependent on growth to remain stable and avoid recession, but the current rates of growth are beyond the ecological carrying capacity of the earth to sustain and technology alone is unlikely to provide sufficient 'decoupling' to avoid this problem. What is more, in addition to providing economic stability, growth is also supposed to deliver increasing wellbeing, but once per capita income exceeds about $15,000 per annum or per capita energy use above 4 tonnes of oil equivalent per annum (the case for most developed nations) GDP or consumption growth alone seems to be relatively ineffective at improving either a sense of happiness or some basic indicators such as life expectancy. As the UK Sustainable Development Commission's report 'Prosperity without Growth' makes clear:

"*There is no case to abandon growth universally. But there is a strong case for the developed nations to make room for growth in poorer countries. It is in these poorer countries that growth really does make a difference. In richer countries the returns on further growth appear to be much more limited. In the language of economics, marginal utility (measured here as subjective wellbeing) diminishes rapidly at higher income levels."* [18]

If this space for the poorer nations is to be created however, and if we are to find a way of living within the limits that the finite resources of the planet place on us, then there is a massive political challenge ahead in terms of finding an alternative to consumerism.

3.3 Growth and poverty reduction in the developing world

3.3.1 The successes and failures of the last 30 years

As noted above, it is clear that in the developing world, where incomes are often very much less than $15,000 per annum and population growth rates still high, there needs to be some form of economic growth to allow countries to accumulate sufficient capital to provide a decent level of income, improve standards of living for all, and eradicate poverty. But are current growth policies followed by governments and donors achieving this? A quick review indicates that there have been some significant successes over the past 30 years in the fight against poverty. Globally, led largely by progress in China and India, 270 million people were lifted above the 'extreme poverty line' of $1[iv] per day (the level of income below which people are assumed not to be able to feed themselves) over the period 1990 to 2004 alone[19]. Progress has not just been in terms of reduction in income poverty either. 1.2 billion gained access to drinking water over the same period[20], primary school enrolment increased by 41 million children between 1999 and 2005[21], and 37 million additional children have been protected with basic vaccines since 2000[22], for example.

Progress has not been universal however and if one excludes East Asia some worrying trends emerge. Table 1 below uses the $2 per day income line – generally considered as the absolute minimum needed to provide food, clothing and shelter – as a baseline to review progress over the 20 year period from 1981[23]. Looking first at the proportion of total population in poverty by this definition, although this figure has reduced by 45% in East Asia over the period, in South Asia progress has been much slower (only a 13% drop), whilst in Latin America little if any progress has been made and in sub Saharan Africa the proportion of population in poverty has actually *grown*.

Region	1981		2001	
	Poor %	Poor (millions)	Poor %	Poor (millions)
East Asia & Pacific	84.6	1168	46.4	846
Europe & Central Asia	4.7	20	19.1	90
Latin America and Caribbean	27.4	100	25.2	131
Middle East & North Africa	28.9	49	23.2	65
South Asia	89.1	821	77.7	1071
Sub Saharan Africa	73.3	289	76.2	514
World	54.3	2447	44.3	2716

Table 1: Proportion and absolute numbers of people falling below the $2 per day poverty line, 1981 and 2001

[iv] The World Bank is now using $1.25 as the poverty bench mark.

In absolute terms the picture looks even worse, as population growth means that although the *proportion* of the global population in poverty fell over the 20 year period to 2001, the absolute number of people existing in the world on less than $2 a day actually *grew* by 269 million over the same period. In all regions except East Asia there was a significant rise in the number of people living on less than $2 per day, with the figure for sub Saharan Africa almost doubling.

The problem is not just confined to income poverty, as a quick selection of statistics shows: 1.1 billion people still have no safe drinking water and 2.6 billion no sanitation[24], 72 million children are still out of school (41 million of them girls)[25], and 26,000 children under age five still die every day from largely treatable and preventable causes[26]. As the charts in figure 6[27] below show, life expectancy has steadily improved in South Asia over the last 30 years. But that success was not the case in much of East and Southern Africa during the 1990's and early 2000's because of AIDS and, whilst life expectancy has started to increase again in some of these countries the trend continues to be a downward one in South Africa and Mozambique, whilst Africa's most populous country, Nigeria, has 'flat lined' at a life expectancy of around 47 now for more than 25 years.

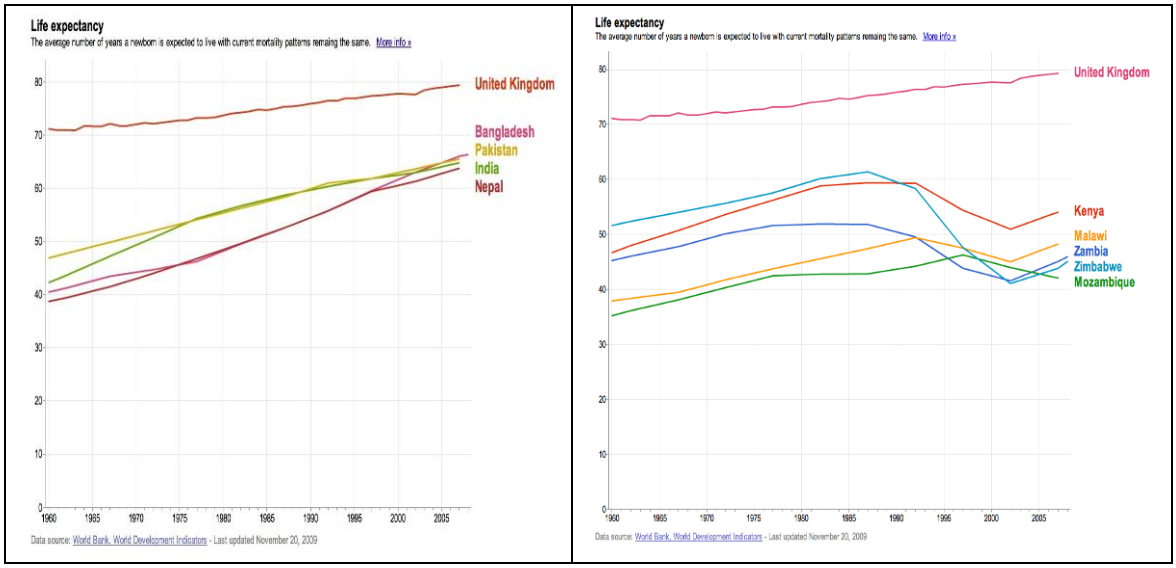


Figure 6: Life expectancy trends over time

Progress has clearly been made, especially in China and India, and we need to learn lessons from these successes. But there have also clearly been problems in many other parts of the developing world and we also need to review the policy prescriptions and circumstances that have been applied there and understand why progress has been so poor in those cases.

3.3.2 The Washington consensus as the conventional policy prescription for growth and poverty reduction

Following the loss in confidence in state driven development at the end of the 1970s, the guiding paradigm for economic growth and development from the 1980s onwards was what came to be known as the 'Washington Consensus' – a policy prescription recommended by the World Bank and IMF (and built on the Chicago school economic theories championed by Margaret Thatcher and

Ronald Reagan) involving rapid liberalisation, deregulation and privatisation of developing country economies. The aim of these 'structural adjustment' policies was to stabilise developing country economies and achieve rapid (and generally export-led) growth of national income, with an assumption that this wealth would then trickle down to the poorest – "a rising tide lifts all boats" being the analogy most frequently applied by World Bank staff.

Structural adjustment policies and the theory of trickle down were the subject of much criticism from civil society organisations, amongst others, in the 1980's and 90's. Duncan Green[28] of Oxfam summarises the conclusions of one major study (the Structural Adjustment Participatory Review Initiative[29]) which was carried out using a methodology agreed with the World Bank and which involved "thousands of local organisations participating in national field exercises on four continents, the majority of which were carried out with the Bank and national governments". The report was highly critical of the negative impact trade and financial sector liberalisation, labour market and agricultural reforms and privatisation had had on the cost of living, livelihoods and income levels of the poor in the countries concerned. The general critique of this and other groups was that structural adjustment concentrated too much on national income growth and not enough on national income distribution and that in some cases– it led to increases in poverty e.g. through the imposition of user fees for health and education. This conclusion chimes with Practical Action's own experience of working in the agricultural sector in Africa, where Washington Consensus style policies have encouraged the treatment of agriculture as an extractive industry producing products for export and de-prioritising support to small scale farmers in marginal areas, with adverse effects on productivity and food security[30].

The World Bank and the IMF did respond to the criticism with promises to reduce loan conditionality and with the introduction of national Poverty Reduction Strategy Papers (PRSPs) drawn up by developing countries and submitted to the Bank and Fund Boards to form the basis of future lending at the end of the 1990s. Green[31] cites the experience of the Government of Mali as recently as 2005, when the World Bank and IMF demanded privatisation of its energy companies and its major export sector (cotton) as a conditionality for accessing any loans or credits to suggest that, in Oxfam's experience "this change of attitude to process has not always been matched by changes in policy advice to governments".

It is not the actions of international financial institutions alone that continue the focus of attention on Washington Consensus policies. The way national governments have shaped their poverty reduction strategies has also often tended to maintain those policies at the centre of mainstream development approaches. Sakiko Fukuda-Parr, Professor of International Affairs at the New School University, New York, carried out an analysis of 22 developing countries' poverty reduction strategy papers in 2008 and concluded that:

"Many of the PRSPs emphasised economic growth as the main means of reducing poverty. Although almost all PRSPs stressed both poverty reduction and growth as priorities, most did not present a strategy for increasing productivity or employment, nor for generating growth in a way that ensures the benefits would be shared more widely – "pro-poor growth". The implicit assumption is that poverty will be reduced by means of a "trickle-down" process when the overall economy grows and investments are made in

social sectors. This approach relies on a model of poverty reduction that was prevalent in the 1980s and it ignores much of the progress made in development thinking in the 1990s.[32]*"*

The continued focus on growth of national income (as opposed to its distribution) as a key driver of development is visible across the policies of the multi-lateral and bi-lateral agencies as well. DFID has growth as a major theme in both the 2007 White paper (Chapter 5) and the 2009 White Paper (Chapter 2)[33]. In the former it asserts *"growth is the most powerful way of pulling people out of poverty"* and seems to make an automatic link between growth and *"higher incomes which help people save, invest and protect themselves when times are hard"*[34]. In the foreword to DFID's 2008 report: Growth: Building Jobs and Prosperity in Developing Countries[35], the then Secretary of State Douglas Alexander claims (without supporting references or data) that *"growth has accounted for as much as 80% of poverty reduction around the world since 1980"* and commits to the establishment of an 'International Growth Centre' to provide high quality advice to developing countries. Likewise, the Commission on Growth and Development[v] claims that *'A growing GDP is evidence of a society getting its collective act together……A growing economy is one in which energies are better directed, resources better deployed, techniques mastered, then advanced"*[36]. Although there is a passing recognition of the problems of the inequitable distribution of the 'benefits' of growth in many of these documents (notably references to this in the 2009 DFID White paper), there's still little evidence of policy prescriptions to address this problem, with the focus instead continuing to be on delivering an increasing GDP above all else. Add to this the continued pressure from the WTO on developing countries to open up their markets and liberalise trade under the (now stalled) Doha round of negotiations and the even more stringent requirements of some of the 'Economic Partnership Agreements' being negotiated by the EC bilaterally with poorer nations (both supported uncritically by DFID in the 2009 White Paper, to the concern of UK development NGOs[37]), and the conventional policy prescriptions for growth and development do not seem to have changed very much from the 1980s, even if awareness of some of the associated problems has increased. The policy objective remains economic growth and the accepted role of the state (with aid if necessary) is confined to providing safety nets, for those who do not 'benefit' from growth.

3.3.3 Have the Washington consensus policies worked?

Given that elements of the Washington consensus policies still exist (evidence of the continuation of certain conditionalities on funding from the Bank, continued push for trade liberalisation by the WTO, the re-emergence of an emphasis on growth as the key driver of development in DFID in the 2006 and 2009 White Papers etc) it's worth examining the impact they have had. Three possible questions come to mind:

1. Have the Washington Consensus policies delivered growth?
2. Has growth, when it's occurred, led to poverty reduction?
3. Has growth proven to be an efficient way of reducing poverty?

[v] A group of twenty-two leading practitioners from government, business and the policymaking arenas, supported by the Governments of Australia, Sweden, the Netherlands, and United Kingdom, the William and Flora Hewlett Foundation, and the World Bank.

The answer to the first question is not clear. There are clear examples of countries managing sustained growth over 2 or 3 decades. The Commission for Growth & Development identified 13 developing country economies that achieved consistent growth rates of over 7% for the past 25 years, including the East Asian economies of China, South Korea, Malaysia and Thailand[38]. However, as Kevin Watkins (formerly senior policy advisor to Oxfam) notes[39]: *"Countries such as China, Thailand and Vietnam may be premier globalisers. They also have a strong record on economic growth and poverty reduction. Yet they have liberalised imports very slowly and still have relatively restrictive trade barriers. Conversely, countries such as Brazil, Haiti, Mexico, Peru and Zambia have been world beaters when it comes to import liberalisation, but have a weak record on growth and poverty reduction."* In other words, some of the countries that followed the Washington Consensus policies faithfully have not grown (e.g. Zambia) and some that have ignored key elements of those policies have experienced sustained and significant growth (e.g. China).

In relation to the second question (has growth, when it's occurred, led to poverty reduction?) the answer again is not clear. The UNDP's Human Development Index (HDI) is an attempt to add additional indicators (life expectancy, school enrolment and adult literacy rates) to GDP to get a broader sense of quality of life. If you map changes in HDI over the past 30 years on to average annual growth in GDP, there isn't always a consistent relationship (see figure 7). China has grown its GDP per capita by an average of 9.3% per annum over the past 30 years and its HDI index has increased (improved) by 47% over the same period. Oman's GDP has grown slower than China's by contrast (6% pa), but its HDI has increased faster than China's (65% over the same period) even though they both started from a similar base in HDI terms. Or, to take a more extreme example, Kenya and Nepal both grew by around the same amount in % GDP terms over the past 30 years (around 4.2% pa). But Nepal has increased its HDI by 77% whilst Kenya's HDI has remained almost static. Growth in GDP does not therefore necessarily translate into growth in income for poor women and men or improvements in their living conditions, even when that growth occurs consistently over a 30 year period (as some of the examples above show)[40].

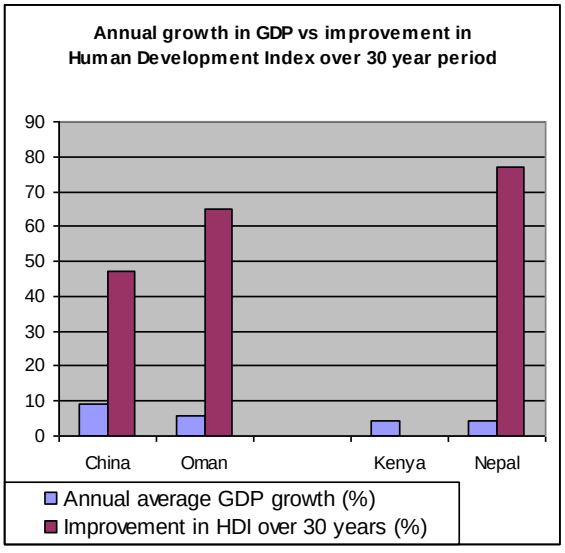


Figure 7: comparison of changes in GDP and HDI for 4 countries over time

Finally, in relation to the question has growth proven to be an efficient way of reducing poverty, at a global level the answer has to be a resounding "no"! The New Economics Foundation carried out analysis to show that; *"between 1990 and 2001, for every $100 of growth in the World's per person income, just $0.06 found its target and contributed to reducing poverty below the $1 per day line. As a result, to achieve a single dollar of poverty reduction, $166 of extra global production and consumption is needed, with enormous environmental impact which counter productively hits the poor the most"*. At that rate NEF calculated we would need 15 planets worth of resources to get the poorest to a minimum income of $1000 per annum[41].

3.4 Why inequality matters

3.4.1 Inequality and the distribution of the benefits of growth within the developing world

In section 3.2 above it was argued that growth of consumption and incomes is still necessary in the poorer developing countries to improve wellbeing. In section 3.3 however it was argued that, although the macro economic rhetoric has moved on, the policies and practices followed by both the principle international agencies and developing country governments themselves (for example in their Poverty Reduction Strategy Plans or PRSPs) have not moved on much from the Washington consensus position and notions of benefits of growth 'trickling down' to the poor. As a result economic growth is, in general, not making a sufficient impact on poverty.

There are exceptions to this however; examples where growth and poverty reduction have been more clearly linked. The conclusion of several empirical studies (unsurprisingly perhaps) is that the impact of growth on poverty reduction in a society is dependent at least partially on how equal the distribution of income and assets is before growth starts – with poor women and men benefitting more from growth in societies where there initial conditions are more equal. A report for the International Labour Organisation (ILO), for example, based on a simulation exercise on the economies of 50 developing countries, concluded that greater distributional equality provides a favourable 'initial condition' for rapid and sustainable growth.[42] The report also concluded that those initial conditions could be affected favourably by distributional policies that will vary from country to country but include land redistribution, progressive taxation, transfer payments (e.g. social security or subsidies to businesses) and consumer subsidies.

Duncan Green of Oxfam notes, in the same vein, that *"land reform was a central feature of the revolutions in China, Russia, Cuba and Viet Nam and the first step on the path of economic transformation in several East Asian 'tiger' economies."* China redistributed ownership of 80% of agricultural land in the 1950's, to the benefit of 90% of agricultural households, whilst South Korea redistributed 65% of agricultural land, benefitting 75% of agricultural households, for example[43].

At a micro level the lesson that distributive actions can unlock human potential is repeated again and again in Practical Actions' own project experience. Fishermen in Sri Lanka being able to sustain a living out of fishing only after being granted the legal right to manage access to and use of the lagoon their livelihoods depend on[44] and landless farmers in Bangladesh moving towards self sufficiency in food only after successfully exercising their right to access common property assets such as sand banks and flood protection embankments[45] being two such examples (see overleaf).

Latin America is often cited as providing examples of the opposite case - high growth coupled with extreme inequality. Kevin Watkins notes that "*A highly unequal country like Brazil has to grow at three times the rate of Vietnam to achieve the same average income increase amongst the poorest 5th of its population*"[46].

It is not just absolute but also relative poverty therefore that effects whether economic growth can deliver a significant impact for the poor. The more equal the distribution of income and resources (or rights to resource use) is at the outset, the more likely it is that subsequent economic growth will benefit the poor.

3.4.2 The impact of inequality on wellbeing in the richer nations

Interestingly, recent published research by British epidemiologists Richard Wilkinson and Kate Pickett[47] suggests that reducing inequality, rather than promoting further economic growth, may be the key to improving wellbeing in the wealthier industrialised nations. The research shows that, within this group of countries, there is no discernable relationship between national income per capita and a whole series of social indicators including life expectancy, infant mortality, maths and literacy, homicide rates, imprisonment rates, teenage births, trust, obesity, mental illness (including drugs and alcohol addiction), and social mobility, whether taken individually or combined into a single 'index of health and social problems' as per figure 8.

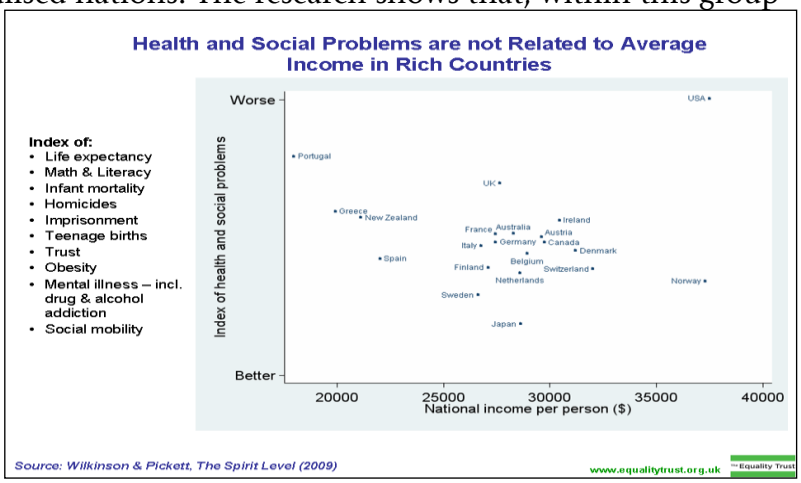


Figure 8: Health and social problems are not related to average income in rich countries

However, there is a very strong relationship between each one of the factors and the extent of income inequality within a country's population (see figure 9). The greater the spread between the income of the top 20% and the bottom 20% of society in a country, the worse that country scores on each of the 10 indicators of health and social problems. This relationship also appears to hold good when comparing different regions within a country, with regions with lower income inequality having less social and health problems that those regions with higher income inequality.

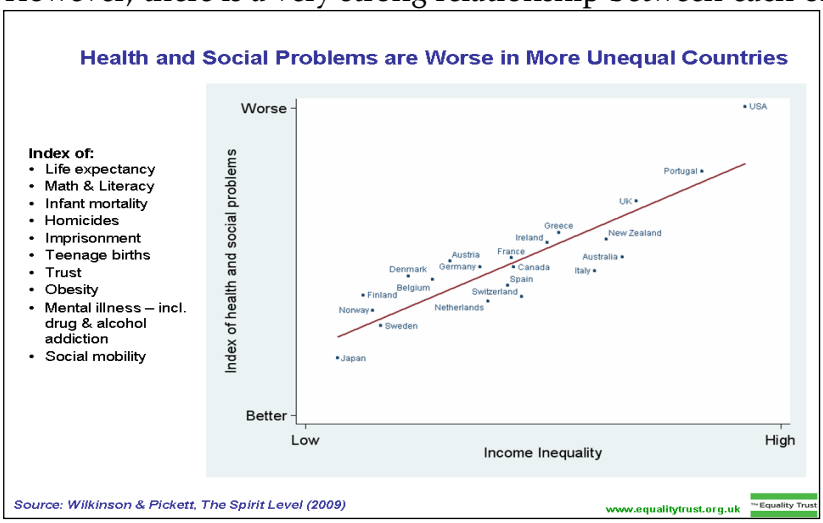


Figure 9: Health and social problems are worse in more unequal countries

Bangladesh – common property resources and productive land for the landless

Erosion of farmland is a major challenge in Bangladesh, with the rivers often changing their courses by hundreds of meters in a monsoon, carving out new channels in the process. Marginal farmers with few assets can suddenly find themselves with none when one of these changes of direction results in their homes and their land being destroyed. Hundreds of thousands of families affected by such natural disasters live precarious lives, often in rudimentary shelters perched on the side of flood protection embankments, struggling to survive now their principle means of livelihood and access to food is lost. A Practical Action project in the Gaibandha District of north western Bangladesh introduced a simple technique of pits filled with compost as a means of turning the sterile sandbanks which line the river courses (and which are only submerged for 3 months of the year) into new productive land for the landless. The three photographs show the transformation of one sandbank from a dune to a field of pumpkins in a single season.

The project has demonstrated how the distribution of rights of access for poor women and men to a common property resource (the sandbank) can be used to secure food and generate considerable income. However, as an external evaluation of the project noted[48], the success of this initiative will not have escaped the attention of the local elite and the challenge in the future will be to ensure that the rights to cultivate this seasonal land are not 'redistributed' away from the poor and back to commercial interests.

Sri Lanka – fishermen securing the right to manage the lagoon their livelihood depends on

Communities relying on fishing the coastal lagoons of Sri Lanka have come under increasing threat from actions of outsiders, including pollution (from sea fishermen driving their diesel engine boats into the lagoon to land catches), fishing at the mouth of the lagoon (which blocks new fish fry from entering and restocking the lagoon), the use of illegal small mesh nets in the lagoon itself, and the impacts of tourism (the construction of small hotels and lodges in the environs of the lagoons leading to pollution and, in one case, the construction of an access road across a lagoon which restricted the natural circulation of the waters). This is a common story across the 40 or so major lagoons in Sri Lanka. Practical Action worked with local fishing communities at two locations (Panama and Rekawa) to fight this problem. The principle issue is the lack of control local fishing communities have over how and by whom the lagoons which they rely on for their livelihoods are used. Redistribution of the rights to manage these natural resources to the fishing communities who depend on them offers the possibility of sustainable management plans being introduced. Following lobbying, an act of Parliament was passed for Rekawa lagoon to designate a local Committee there as an Authority with legal powers to regulate fishing in the lagoon. In Panama, although formal management rights have not yet been secured, negotiations with the sea fishermen have resulted in a new landing site being created which avoids the motor boats entering the lagoon, removing one of the obstacles to restoring fish stocks in that location. Improved fish drying and processing technologies are also being introduced to increase the value of the fish products produced. But these technologies will have no value unless the formal rights to manage the lagoons in a sustainable manner are redistributed to other fishing communities whose livelihoods depend on these natural resources.

More interesting still, the negative impacts of living in a society with a high degree of income inequality do not just accrue to the poor but impact on every group across a society. For example, the US has greater inequality of income across its population than does the UK and the rates of diabetes, hypertension, cancer, lung disease and heart disease are all consistently higher in the US than in the UK across all social classes. In turn, income inequality in the UK is worse than in Sweden and the Swedes suffer significantly lower infant mortality rates than the UK, again across all social classes[49]. Greater equality thus appears to benefit not just the poor but the better off too.

What would happen if inequality were reduced? "If the US were to reduce its income inequality to something like the average of the four most equal of the rich countries (Japan, Norway, Sweden and Finland), the proportion of the population feeling they could trust each other might rise by 75%..., rates of mental illness and obesity might similarly be cut by almost two thirds, teenage birth rates could be more than halved, prison populations might be reduced by 75 percent, and people could live longer whilst working the equivalent of two months less per year.[50]"

3.4.3 Global inequality

Inequality within nations is clearly an important factor in determining levels of poverty or conversely levels of wellbeing. We've seen above that the greater the 'starting point' inequality of income and access to and control over resources in a developing nation, the less likely national economic growth will help to reduce poverty or improve wellbeing for the poorest in society. We've also seen that income inequality is an important factor in the more affluent countries as well, having a direct and measureable impact not just on the poor but on the well being of all levels of society.

It's clear though that inequality exists not just within nations but also between them. In terms of income, global inequality has clearly increased radically over the last century, as the figure 10[51] shows. Fed by inequalities of power and inequitable terms of international trade and a global macro economic model that takes $166 of global growth to achieve just $1 of poverty reduction (see section 3.3.3 above) this trend is clearly doing little to end poverty in the developing world.

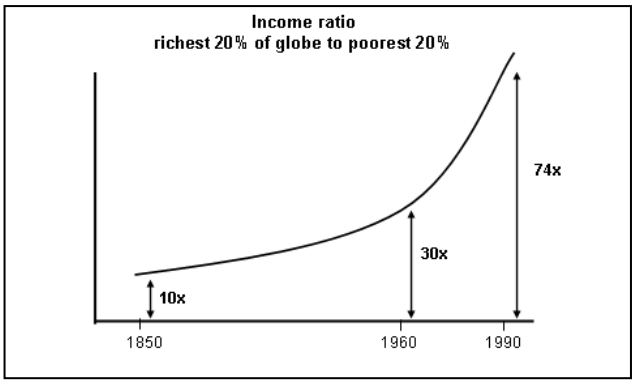


Figure 10: Relative global inequality over time

But in a carbon constrained world, where we all face the common threat of climate change, it is possible to say with conviction, perhaps for the first time in history, that this global form of inequality is bad not just for the wellbeing of the poor in the developing world, but bad for the wellbeing of everyone on the planet: rich or poor, affluent or developing country citizen. At the time of writing this we can look back on the failure of the Copenhagen international climate change negotiations to produce a binding agreement to limit future

global emissions to a level that would avoid catastrophic planetary warming as a huge missed opportunity. What was the major sticking point that ultimately stalled the negotiations? Inequity! The historical responsibility for climate change lies principally with the industrialised nations as they are the principle source of historical carbon emissions. Although some of the larger developing nations (notably China, India and Brazil) are now major carbon emitters themselves, they have only recently reached that position and argue they have a right to continue to increase their energy consumption to grow their economies to reach the levels of development already achieved by the industrialised nations. To deny this would, in effect, be to freeze the current inequality in terms of living standards between the developing and developed worlds. The only way a globally binding agreement that prevents catastrophic climate change occurring will be achieved is if the developing world feels it has reached an equitable deal with the industrialised nations in terms of a massive transfer of resources from affluent to poorer nations to finance a clean development path for them. Clearly at Copenhagen the developing world did not feel that deal was on offer.

Although a degree of climate change is now already inevitable, and although it will hit the poorest people in the poorest countries first and hardest, a failure to curb future global carbon emissions to limit warming to 2 degrees C will ultimately lead to profound environmental and economic problems for all people in all nations. Only by dealing with the global injustice that is poverty in the developing world, only by taking action to reduce the inequality in living standards between the developing and developing worlds will we be able to reach the necessary global political settlement to avoid an environmental catastrophe.

3.5 Lessons – towards an economics for sustainable development

Five lessons can be drawn from the above: in relation to growth, poverty and environmental sustainability:

1. In the short to medium term developing country economies will have to continue to grow to help the 40% of humanity on less than $2 per day reach reasonable standards of living. However, the growth model will have to change as the one followed by most institutions in recent years - the Washington Consensus - has not delivered in terms of poverty reduction. Those who prospered the most (such as China) ignored many of its strictures. Moreover, given that a focus on growth of national or global GDP alone does not automatically lead to poverty reduction, other policies and conditions are also needed.

2. Addressing issues of inequality at all levels is one such required policy. Levels of inequality in a society are a key factor in determining how much growth is or is not channelled into poverty reduction and so policies that reduce inequality within a nation, such as land redistribution, progressive taxation, transfer payments, consumer subsidies and access to basic services are critical pre conditions for pro poor growth in the developing world. Interestingly they also appear to determine the levels of wellbeing achieved in developed countries as well. At the micro level, inequalities of power within households (e.g. between women and men, able and disabled, and between generations)

mean that it is not sufficient to target such policies at social groups per se, but to also focus particularly on reaching the most marginalised within them. At the global level, addressing inequalities between the developed and the developing world's entitlement to and use of carbon and other natural resources obviously determines, to an extent, the size of the resource base available to the developing world to tackle poverty itself.

3. Continued reliance on global economic growth as the core driver of economic policy, at least in its current form, is clearly not compatible with a sustainable future. Although, in the short to medium term developing country economies will have to continue to grow to achieve reasonable standards of living for their poorest citizens, the developed world and, eventually, the entire global population, will have to find a different driver to match economic through-put with resource constraints if we are not to outgrow the ecological carrying capacity of our planet. The current international climate change negotiations can be seen as part of this process, which will eventually have to lead to environmental pricing of goods and services putting further limits on growth and greater emphasis on redistribution to deal with poverty in order to reach a deal on carbon with the developing world.

4. The statistical indicators we choose to measure and track are crucial for designing and assessing policies aimed at promoting development and ensuring a sustainable future for all. If focus on national and global GDP growth as an indicator has failed to lead to appropriate policies we need alternative indicators that are more likely to be helpful. There is growing support[vi] for the idea that measurements of people's sense of wellbeing combined with measurements of the environmental sustainability of the actions we take are more likely to provide the information necessary to create policies that help fight poverty and ensure a sustainable future for all of us.

5. There is a huge political challenge ahead. We will not wean ourselves off growth as the key indicator of progress without also tackling our obsession with consumption. We will have to find a way to stop seeing ourselves as consumers (with fixed preferences that just have to be met by the market) and instead behave as active citizens (with the capacity to understand the moral choices facing us and the ability to act). We will have to find a way to respond to the call for a new 'politics of the common good' where, as active citizens, we try to change our personal preferences so they are in the interest of the greater good rather than pursuing self interest alone.

[vi] Most recently from the Commission on the Measurement of Economic and Social Progress set up by President Sarkozy of France and including leading economists such as Prof. Joseph Stiflitz, Prof. Amartya Sen and Lord Stern.

4 Technology and development

4.1 Introduction

The pursuit of modernisation through the access to ever more sophisticated levels of technology has, together with economic growth, underpinned ideas of development for the last half century. In his book *Science & Technology for Development* the Edinburgh based academic James Smith traces the way views of how this is supposed to happen have changed over the years. In the 1960s one school of thought saw development in terms of a linear process of modernisation, whereby countries pass through a 5 stage model from "traditional society" via industrialisation to an "age of mass consumption" with "widespread affluence, urbanisation and the consumption of consumer durables". More recently the alternative idea of "technological catch-up" whereby countries can develop their skills base and use new technologies to leapfrog stages of the linear model and catch up or even overtake richer "leader" countries has been an idea "that many countries aspire to"[52].

Although the importance of access to technology in the fight against poverty cannot be understated, in reality pro-poor technology innovation has, like pro poor growth, often proved to be difficult to achieve. This chapter explores why this is so and what, therefore, needs to change if technological innovation is to benefit the poor.

4.2 Why technology is important to development

Technology is important to the development of a society because of the benefits use of improved technologies can bring. But it is also important because some technology choices can bring with them uncertain and sometimes detrimental consequences. Technology is of course not used in a vacuum but within society and social relations can, in turn, affect what a technology means and the impacts it has in different societies. All three of these ideas are examined in a little more detail below.

4.2.1 Technology as a fundamental component of development

Practical Action's strategy[53] summarises why we believe technology is critical to development:

For thousands of years men and women have used their ingenuity to sustain and improve their lives. They have used their skills and knowledge, together with artefacts and the natural environment – Technology, in other words – in personal and domestic life to meet their basic needs for food, water, and shelter. They have used technology to provide a livelihood, whether in farming and fishing, or trade and manufacturing. They have used technology to build and cement social relationships and to express their culture.

Technology then is people using knowledge, tools, and systems (procedures and organisation) to enhance all aspects of their wellbeing. The development of technology, its transfer and its use, are therefore affected by social forces, political choices, economic influences, cultural norms and institutional preferences.

Human development has gone hand-in-hand with technical change. Technology development and adaptation enables people to achieve wellbeing with less effort and drudgery, or at lower cost and with fewer resources. Innovation – meaning the use of new knowledge, tools or systems by people who have not used it before – is essential for people to be able to make more effective use of the resources available to them and to respond to social, economic and environmental changes. Innovation enables people to improve their wellbeing and plays an essential part in human development.

Though the development and use of technology has not always been for the good of all, we know access to improved technology can be an effective lever out of poverty. Its absence is a key feature of living in extreme poverty.

4.2.2 Technology choice as a factor shaping society

Schumacher saw technology not as ideologically neutral but as something that bore the hallmarks of the society that developed it. As such, he saw technology development and transfer as a fundamental formative force in society. The technology choices we make, according to Schumacher, can shape the values, norms and culture of the society we then get. In Good Work he used a quote from the Prime Minister of Iran in 1976:

"There are many aspects of the West we particularly wish to avoid in the industrialisation of Iran. We seek the West's technology only, not its ideology[54]*"*

To which he (Schumacher) then responded:
"The implicit assumption is that you can get a technological transplant without at the same time getting an ideological transplant, that technology is ideologically neutral; that you can acquire the hardware without the software that lies behind it, that's made it possible, that keeps it moving. Isn't that a bit like saying I want to import eggs for hatching, but I don't want chicks from them but mice or kangaroos?"

Schumacher went on to suggest that:
*"It's a great mistake to under-estimate the effect of ….(*technology)….*on people's lives, not just their standard of living:*

- *How they produce, what they produce*
- *Where they work, where they live, whom they meet*
- *How they relax or 'recreate' themselves; what they eat breathe and see*
- *And therefore what they think, their freedom or their dependence"*

Schumacher argued that some technologies are so inherently ideological that they can cause society to reorganise itself to accommodate them. For example, if society chooses a form of agriculture based on mechanisation, fertilisers, hybrid seeds etc, that can in turn, determine a whole range of societal outcomes because we have to organise our selves in a way which allows that technology to operate (on its own terms) 'efficiently'. Choosing such technology can then determine 'optimum' farm size, agricultural labour force size, and therefore the size of population that can be sustained in rural areas, the quality of life there and the rate of urbanisation, the ecology of the countryside, the economics of food distribution system, what we eat (and therefore our health), how much of our income is spent on food, the size and location of our shops etc etc.

In Schumacher's view technology choice therefore is critical to development not just for the potential benefits a good choice could deliver, but also because of

the potential adverse and unforeseen consequences for society a 'bad' choice could lead to.

More recent academic research on science, technology and development (e.g. Smith[55] and Leach[56]) support the idea that certain 'platform' technologies can lead society down different developmental pathways in the way Schumacher envisaged, but place a greater emphasis on uncertainty and our inability to develop ways of predicting those paths in advance. Instead of trying to anticipate how technologies will impact on society, this research places more reliance on creating wider governance arrangements to allow different parts of society a voice in appraising risks and making decisions about technology investments. There are a number of examples in recent years where there have been calls for such governance structures to be created in relation to the application of new science in the developed world, notably in relation to the use of GM material in food, the use of human embryo material in stem cell research and the use of nuclear technology for power generation.

4.2.3 Technology, society and societal relations

Technology is embedded in society and the social relations within it. So, although certain 'platform technologies' can open up options for society to go down different developmental pathways, the meaning, use and impact of a technology can, in turn, be shaped by the nature of the society in which it is used.

The choice of technology can often be driven more by what its possession and use says about the owner's social position than by its utility alone. This can be as true of type of mobile phone a consumer chooses in the UK as it can about the choice of cooking stove in Sri Lanka, for example. But the meaning that a technology may have can change from one society to another.

What is viewed as a desirable attribute in one place may not be seen as attractive in another, affecting how or if a technology is used. Access to a latrine in a crowded slum in Dhaka may be highly prized for the privacy and dignity it confers whilst in low density rural Zambia it may be seen as an ostentatious but unnecessary expenditure (with the health benefits the technology could provide not being a major factor in the decision to invest in either location!).

The introduction of a new technology can also liberate or alternatively reinforce existing power relationships. So, for example, the introduction of new vegetable seeds and horticulture techniques and could improve the nutrition levels of households and provide women with a new source of income or see women's role in and control over this area of domestic agriculture taken over by men seeking to exploit the cash earning potential, depending on the relative position of men and women in that society.

4.3 When technology innovation <u>does</u> deliver developmental benefits.

We know (from the work of Practical Action and others) that access to improved technology can make a huge difference to people's lives – providing access to

basic services such as water, energy, transport and housing; helping in the development of sustainable livelihoods and providing for reliable and sufficient food supplies; providing the platform from which improvements in health, education, income and wellbeing can be achieved. It's difficult to overstate the developmental benefits that can come from access to appropriate technology, as three examples from Practical Action's own work show:

1. Access to a basic service such as a reliable modern energy supply can make a huge difference to standards of living. An evaluation in 2005 of 9 micro hydro schemes constructed by Practical Action in Peru[57] (which had been operating on average for six and a half years at that point) concluded that there were significant multiple benefits arising. The report showed that, in addition to providing a basic energy supply to nearly 1000 households, installation of the micro hydro systems had contributed to the establishment of 216 small businesses which led 60% of the beneficiaries to report an increase in household income (with half of these reporting the income increasing by more than one third). It also showed a reduction in household expenditure on energy (previously supplied by kerosene and other more expensive sources) of the order of 60 to 75%, improvements in health care (brought about by lighting and improvements in equipment in health centres) and particular benefits to children, both in education (lighting and equipment such as computers at schools, lighting at home extending study time, better services in general attracting more teachers into the area) and leisure (access to TV).

2. The acquisition of improved technical knowledge can also bring about big changes. In the Turkana region of northern Kenya animal health is critical to the livelihoods of pastoralist communities but formal veterinary services often fail to reach the remote places where many pastoralists live. A Practical Action project working with the District Veterinary Office in Turkana to train volunteers from pastoralist communities as Community Based Animal Health Workers (CBAHWs), helped them gain a basic technical knowledge of common cattle diseases and their treatment. It also provided a start up stock of medicines. This access to new knowledge has resulted in survival rates of treated animals in the area increasing from 15% to 70%[58]. It has also led to improved monitoring of disease by the District Vet (via the CBAHWs), allowing a faster and more effective government response to disease outbreaks.

3. Sometimes the simple transfer of existing traditional technologies from one community to another can open up new possibilities. In Gaibandha in northern Bangladesh the introduction by Practical Action of two agricultural techniques already in use elsewhere in the south of the country had a major impact on food security for 3000 families. The techniques involved bringing sterile sandbanks into production using pits filled with fast acting compost during the dry season and the use of floating gardens made of mats of water hyacinths covered in soil in the monsoon to provide cultivable space for food production for those with no access to land of their own[59].

The introduction of very modern and rapidly developing science based technology can also have significant benefits for the poor, as the spread of mobile phones in the developing world has demonstrated in recent years. A survey[60] carried out in 2008 by the International Telecommunications Union

(ITU), an agency of the UN, found that 60% of the world's population now have mobile phone subscriptions, quadruple the number in 2002. Africa is the continent with the fastest growth, where penetration has soared from just one in 50 people at the turn of the century to 28% now. Much of the take-up is probably due to the inadequacies of existing landline networks and the pay as you go mobile phone packages, which allow people to access the technology for a relatively small sum of money. Another driver is thought to have been money transfer services that allow people without bank accounts to send money speedily and safely by text messages, which the recipient - typically a family member - can cash in at the other end. Vodafone's M-Pesa money transfer service was launched in Kenya in 2007 and now has 5 million users. Practical Action's own experience of the benefits the technology can bring includes its use on a project in Nepal aimed at reducing risks associated with monsoon flooding. Using mobile phones to link upstream and downstream communities allows the former to provide early warning to the latter of rising river levels, enabling people to move themselves and key possessions to safety. We have also seen mobile phone help lines being established in Bangladesh (for health and agricultural extension advice) and in Nepal (to help farmers access the latest market prices). Globally, mobile telephony expansion now outstrips fixed line connections, which are remaining static, and is an example of a new technology leapfrogging an existing one and rendering it near redundant.

4.4 Technology Injustice - why technology doesn't always deliver developmental benefits at the moment

4.4.1 Where the use of technology hasn't worked

Although we know improved technology can make a huge difference to people's lives, it is clear that the innovative effort needed to make this happen has failed to occur for a large part of the World's population. The consequences of this failure can only be classified as a great injustice. If we look at the three areas that form the basis for much of Practical Action's own programme of work for example:

- Lack of access to services to the poor. Access to the basic services that are taken for granted in the developed world is far from universal in the developing world. 1.6 billion people do not have access to electricity; 2.4 billion people still depend on traditional biomass for cooking; 1.5 billion people still live in inadequate shelter; 1.3 billion people still have no access to safe water; and 2.6 billion have no sanitation. Technology is clearly critical to filling this gap and ensuring access to basic services for all.

- Lack of technology effort targeting poor women and men's livelihoods. Despite the fact that 40% of the world's population has to live on less than US$ 2 per day, technological innovation today is far more likely to be aimed at enhancing the lifestyles of the populations of Europe and North America and wealthy consumers in the developing world, than it is at establishing new sustainable livelihoods for those living under the global poverty line. The gap to be filled here relates to poor women and men's access to the improved technologies that will help them create sustainable livelihoods through improvements in productivity, adding value to existing production,

or creating new employment opportunities in, for example, service provision, manufacturing or food production.

- Technology failing to feed the world. Whilst the developed world is experiencing an obesity epidemic, nearly 1 billion people in the developing world go hungry[61]. Moreover, population growth means that the world will have to feed 50% more people by the end of the century, with most of this increase occurring in the developing world, where matching food production to demand is already a problem. Technology will clearly be a critical part of meeting the challenge of producing sufficient food at prices affordable to all at the right time and in the right place, without degrading our soils and natural resource base.

Interestingly, much of the technology that is needed to address these problems already exists, which leads to some puzzling questions. For instance, the health benefits of clean drinking water and sanitation facilities have been understood for centuries: the Romans had piped water for their public baths and the Victorians in Britain had their sewerage systems. So why have the basic technologies needed to provide clean water and sanitation not yet been spread to everyone? Edison invented the electric light in 1880, so why is it that almost a quarter of humanity still has no access to electricity?

As mentioned already, Schumacher saw technology as inextricably linked to ideology. His short answer to this question (in his book *Good Work*, published 3 years after *Small is Beautiful*) was a radical one:

> *"If our technology has been created mainly by the capitalist system, is it not probable that it bears the marks of its origin, a technology for the few rather than the masses, a technology of exploitation, a technology that is class orientated, undemocratic, inhuman, and also unecological and nonconservationist?*[62]*"*

Whether you agree with the language or not, Schumacher was correct in implying that there are multiple reasons why the existence of a technology itself does not guarantee people will be able to access and use it to improve their wellbeing. These 'barriers' to widespread adoption of useful technologies can be broadly grouped under two headings – barriers to innovation and barriers to dissemination:

4.4.2 Barriers to innovation

Barriers to innovation discourage the development of technologies that are appropriate to the needs, capabilities and resources of the poor. These include:

A lack of recognition of the potential of indigenous knowledge
National science and technology policies today usually focus on what can be done to foster innovation within the field of new, science-based technology. The possibility that more traditional or indigenous knowledge bases may also have something to offer is, more often than not, ignored. This is perhaps partly because of the retreat of the State from many R&D roles over the past few decades in favour of the private sector which has, in turn led to a focus on knowledge which can be commoditised and commercially exploited. But it's also

Farmer with good crop of traditional paddy variety on saline land

In Sri Lanka Practical Action has been working with marginalized farmers who could generally be described as having no capital funding, owning less than 1 acre of farming land (often with very poor soil), and reliant on rainfall supplemented by only very minor irrigation schemes. The tsunami in 2004, which led to the salinisation of the soil in many coastal areas, added to the numbers of these marginalised farmers. One such farmer from Manajjawa, Ambalanthota takes up the story:

"I am Ranjith. I took up paddy farming just like my forefathers before me. Our paddy lands have always had a high level of salinity due to the proximity to the sea and harvests have been low. The sea water that gushed with the Tsunami of 2004 got deposited in the paddy fields in this area and further aggravated this condition. Due to the high level of salinity in the field, paddy seedlings started dying. Little by little, with each season, the harvest reduced. After the third season it became almost impossible to plant paddy. The modern varieties of paddy which we were used to growing were unsuccessful in this high saline condition. We were on the verge of abandoning the only form of livelihood we knew.

It was at this crucial juncture (2005 September) that two organizations, namely Practical Action and the National Federation for the Conservation of Traditional Seeds and Agricultural Resources (NFCTSAR) came forward to help us. This problem had been highlighted in the participatory rural appraisal (PRA) which was conducted in our village following the Tsunami. These organizations suggested that we grow 10 traditional rice varieties on a trial basis. They said according to indigenous knowledge there are certain traditional rice varieties suitable for growing in saline conditions and they had done some trials which proved this. NFCTSAR provided us the required seed paddy. They also trained us on appropriate cultivation methods. Sixteen farmers in this area (including myself) tried out these traditional varieties for 3 seasons. At first we were rather sceptical. However to our surprise and delight, seven of the varieties did in fact flourish in the saline conditions.

We used organic fertilizer instead of chemical fertilizers for growing these traditional varieties, as recommended by the above organizations. During the same period, a modern hybrid paddy variety was cultivated in the paddy field adjoining mine. This paddy field was fertilized with costly chemical fertilizer. Pesticides had to be sprayed as well to safeguard the crop from pest attacks. Finally this was largely unsuccessful. I on the other hand used only organic fertilizer, the raw material for which could be easily sourced within the village with minimal cost. Pesticides were unnecessary since the indigenous seed paddy was capable of resisting pest attacks. I realized that If I grew these varieties commercially, the cost of production could be reduced significantly.

Our trials revealed another unexpected result. In the case of certain saline resistant traditional rice varieties such as "Rathdel", "Dahanala", "Madathawalu" and "Pachchaperumal" the yields were high. Earlier when we grew modern paddy varieties, we got only 15 to 20 bushels from an acre. Now with these traditional indigenous varieties of paddy, yields can be as high as of 60 to 70 bushels per acre. We were used to modern varieties and thought that these would bring forth a better yield. However after receiving training and observing the results I am now convinced that growing traditional rice varieties is a good option for saline affected paddy fields such as mine.

Case study 2: The power of indigenous knowledge – traditional farming techniques bring coastal land in Sri Lanka back into production after failure of modern rice seed.

perhaps in part due to a sense that it is modern science based technology that defines development, modernity and 'progress'.

Within the agricultural sector for example the focus of research is largely weighted towards the further development of inputs (modern (and GM) seeds, herbicides, pesticides, improved breeds of livestock etc). Driven by commercial imperatives that drive agricultural investment and their bias towards short-term financial gain, the dominance of this form of agricultural research has resulted in a narrowing of the genetic base of our food chain (both crops and livestock[63]) and a dependence on an energy intensive form of farming, neither of which puts us in a good position to face up to the future challenges and shocks, such as that of adapting to climate change. Research into improvements in the productivity of traditional agro-ecological or organic systems of farming, where the opportunity for commoditised products is lower, has not attracted the same degree of funding, despite the potential benefits in a future carbon constrained environment and more variable climate.

Practical Action's work has often shown the benefits of taking traditional knowledge more seriously. Examples have included:

a. Bringing rice fields abandoned because of salinisation back into profitable production using organic techniques and traditional seed varieties in Sri Lanka (see box on previous page).
b. Promoting traditional 'floating gardens' (rafts woven from the stems of water hyacinths and covered in soil) in parts of Bangladesh as a way of helping people made landless by river erosion still be able to grow food during the monsoon.
c. Using traditional building methods (including domes and barrel vaulting techniques for roofs) to construct 'timber-less' houses in Darfur in Sudan, where deforestation has led to a lack of wood for construction.

Intellectual Property Rights (IPR) as a barrier

The flip side to ignoring the potential of indigenous knowledge is the use of IPR rules to capture and commoditise, for private gain, knowledge which has hitherto been available freely. The purpose of IPR laws is supposed to be to encourage innovation by protecting the innovators' right to exploit the fruits of their labour commercially for a fixed period of time. IPR rights have been strengthened in recent years under the TRIPS (Trade-Related aspects of Intellectual Property Rights) rules established by the WTO in 1994. TRIPS is a powerful and legally binding agreement backed up by a strong WTO panel that has the power to enforce sanctions on countries that break its rules. In 'Science & Technology for Development' James Smith notes there is some debate about the value of IPR for less developed countries. "There are relatively few benefits in terms of stimulating local innovation in developing countries, as technological activity in such countries tends to focus on learning to use imported technologies rather than to innovate new technologies". He goes on to say "evidence suggests that strong IPR only begins to benefit countries with per capita incomes above $7,750, as they move away from building local capabilities through copying and begin to engage in more innovative activities"[64].

IPR can add high costs to technologies, rendering them unaffordable in poor countries. The case of anti-retroviral drugs for HIV-AIDS referred to later in this chapter is as an example. But IPR can also act as a threat to traditional

knowledge. In his book on intellectual property, biodiversity and sustainable development the economist Martin Khor discusses the misappropriation of traditional biodiversity knowledge or 'biopiracy[65]', citing it as one of the most 'complex problems facing the future of traditional knowledge". In most developing countries there has been no tradition of private ownership of knowledge concerning bio-diversity, for example related to agriculture, livestock, fishing or the use of naturally occurring plants with medicinal properties. Knowledge concerning the cultivation of seeds or the use of plants or the breeding of animals has been shared between communities and individuals and has been one of the key factors in maintaining biodiversity both in farming systems and in natural habitats. Khor argues that "this system of cooperative innovation and community sharing is facing a challenge from the new system of knowledge rights represented by IPRs and the TRIPS regime". He also claims that the concept of IPRs "places emphasis on private rights of ownership of knowledge or resources which are biased (in criteria of eligibility and in the practical process of obtaining a right) in favour of corporations or institutions that have the means and technique to obtain the rights, at the expense of local communities that find it difficult or impossible to meet the criteria or to participate in the process of obtaining the rights to which they should be entitled." Khor backs this up with examples showing:

- Attempts to create huge market monopolies through the registration of very broad patents which contain "bio piracy elements" (one example being the US company Mycogen's European patent that covers the insertion of "any insecticidal gene in any plant" and which is based on *Bacillus thuringiesis* (Bt), a naturally occurring soil bacterium which produces a protein that is fatal to many insects that consume it, which has been used as a biological pesticide by farmers since the 1940's)
- Attempts to patent traditional uses of medicinal plants including a Japanese company patenting various traditional Filipino herbal remedies, American scientists patenting a protein from a native species of Thai bitter gourd after Thai scientists found that compounds from that variety could be useful against the AIDS virus, and a (failed) attempt by US scientists to patent the use of turmeric for healing wounds (a traditional remedy for sprains, inflammatory conditions and wounds in India for centuries).
- Patents held on gene sequences for staple crops, mostly by American and Japanese companies, including rice, maize, potato and wheat varieties.

One of the key issues here is that if it is a seed that is being patented, this could lead to the situation where farmers in developing countries, including possibly the country from which the seed material originated, being forced to "buy and use, but not save and reuse" seed and thus incur greater costs. There may also be restrictions on the ability of countries to conduct further research using the seed.

Inappropriate R&D investments

Improvements to technologies – technology development – can lower financial and non-financial costs, improve quality, create new products, and help reach new markets. Technology development can take place through invention and innovation, through the adapting of existing technologies new to a particular place, and through the widespread adoption (diffusion) of technologies within a country.

As noted above, technology development in developing countries is largely through the adoption and adaptation of technologies that already exist somewhere else. This tends to be evolutionary and incremental. People learn to make changes in their technologies through their own experience and from a variety of other sources (customers, suppliers, neighbours, competitors, etc.).

Though technology development for poor users in developing countries is mainly a matter of adapting technologies to local circumstances, there continues to be a need for R&D for public goods and for poor users. Local innovation by users of technology is an important force for change, but it is not always enough. However, most of the world's technology development – and expenditure on R&D – takes place in industrialised countries, funded by private sector organisations. In a 2007 report UNCTAD[66] concluded that: *"today high income countries spend around 1.5 to 3.8 per cent of their GDP on R&D and fund more than 80 per cent of the world R&D activities. In contrast, most developing countries spend less than 0.5 per cent of their GDP on R&D activities and some developing countries spend as little as 0.01 per cent of their GDP"*. R&D is thus predominantly commercially driven and for industrialised country consumer markets (in the field of medicine for example this imbalance led the Global Health Forum to estimate in 1990 that only about 5% of the world's resources for health research were being applied to the health problems of low- and middle-income countries, where 93% of the world's preventable deaths occurred[67]).

This disparity in application of funding for research is also reflected in the agricultural sector where FAO[68] reported in 2009 that just five countries (US, Japan, China, India and Brazil) accounted for 48% of $23 billion global annual public investment in agricultural R&D, whilst 80 of the lowest income countries consumed only 6% between them. In the case of the $16 billion global annual private sector investment in agriculture R&D, the FAO reports even less spent on research likely to impact on the poor, with just 2% of spend being in the developing world.

In 'Science & Technology for Development' James Smith argues that "we are currently witnessing an enormous shift in the balance of power of research and development[69]". He notes that "the five largest technology-led multinational companies – Bayer, Dow Agro, Dupont, Monsanto and Syngenta spend $7.3 billion per annum on agricultural research", twenty times the budget for the world's largest publicly funded agricultural R&D system for developing countries (CGIAR). Smith believes that this shift to private funding of research is problematical in that in the area of R&D "the market does not and indeed cannot respond to the needs of the poor". FAO seems to concur, commenting that "the role of the private sector in most developing countries is small and will remain small given the limited funding opportunities and incentives for private research[70]".

We have to conclude that we cannot rely on the private sector and market mechanisms alone to deliver science and technology that is either pro poor or able to improve and prolong our custody of nature's scarce resources rather than deplete them. We need to recognise that market mechanisms provide not just incentives but also disincentives for others to innovate and that public finance is likely to be needed to ensure technology development meets the needs of the poor.

Flawed understanding of innovation processes
Funding for R&D is a necessary but not sufficient condition for technical innovation that will benefit the poor however. The way in which technical innovation and dissemination takes place also has an effect on its impact on the poor, as the following brief historical review shows.

Looking back over the 4 decades Practical Action or ITDG has been in existence, we see that 4 sets of ideas about technology and poverty common to development thinking can be distinguished at different points in time, as summarised in the chart below.

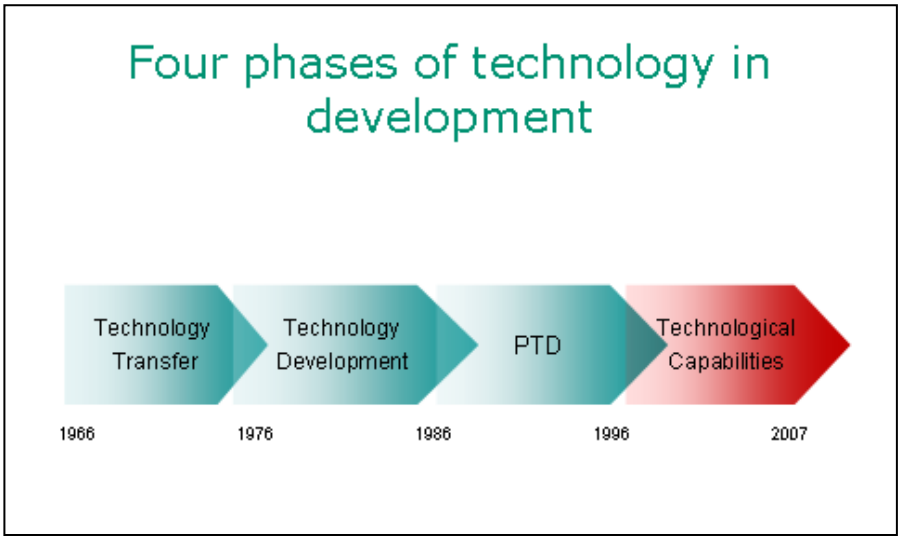


Figure .: Technology paradigms in development practice over time

During the 1960's to early 1970's there was the idea of just transferring the best modern technology from north to south. If there were problems with agricultural production just send modern tractors. If there was a shortage of cement, import a modern cement production plant. In many cases the technologies transferred never took root, and we saw plenty of examples of machinery abandoned because it wasn't right for the job or it couldn't be maintained.

By the mid 1970's the idea that Practical Action (then ITDG) was born with – the need for technologies to be developed that were appropriate to local conditions, began to be taken more seriously by some. To go back to the idea of cement works for example, the problem with modern cement rotary kilns in many cases was that they were too large and produced cement which was too expensive for local markets in developing countries. Small-scale cement production was one of three manufacturing technologies that ITDG began working on in the 1970s with an Indian partner, using the vertical shaft kiln technology, a technology which had largely been abandoned in the 19th Century in Europe. The units had a capacity of around 50 tonnes per day, compared with the 2,000 to 3,000 tonnes per day that might be found in conventional, large-scale rotary kilns. Though the yields were lower and they produced cement of more variable quality, they had the advantage of reduced transport costs, being closer to both raw materials and markets. The first commercial small-scale cement plant went into production in 1981. Within four years, there were 19 units in operation and there are now some 300 in India with a total installed capacity of around 11 million tonnes a year.

There was a lot of work in the 1980's also on developing small scale technologies aimed more at smallholder farmers and micro enterprises for those on less than $2 per day. Some technologies, like simple tray driers for crop processing or more efficient cooking stoves prove to be great successes. But there were some notable failures as well – the multi purpose animal drawn tool platform being one. Designed to increase small farmer productivity it was meant to be able to act as a plough, a seed drill, a weeder, a sprayer etc. But after years of research and trials by agriculture research stations around the world, it remained a technology rejected by small farmers everywhere, mostly on grounds of cost and awkwardness of use. In a sense this multipurpose tool platform is a classic example of what might be termed the 'Widget Trap' - engineers developing a technical solution and then trying to find an appropriate 'problem' to apply it to.
So although the idea of technology development specifically for the developing world was an improvement on straight technology transfer from the developed world in some cases, it also didn't provide all the answers in terms of leading to widespread adoption of improved and beneficial technologies by the poor. Too often the widget trap prevailed, not least because most of the time this was still technology developed by engineers in Europe and America to address problems identified by development experts, also from Europe and America.

By the mid 1980's people became interested in participation in development however and this began to affect the way we looked at technological innovation as well. Maybe improved technologies would be used more if we worked with local people to find solutions to problems they identified, rather than relying on the opinions of 'experts' alone – the concept of Participatory Technology Development. This process is not unknown in other sectors – the Beta testing of software by major IT companies today is in a way an example of participatory technology development.

To give an example from Practical Action's own work, if you go back to the analogy of problems with agricultural production and sending tractors, well maybe tractors aren't the only solution. Certainly when we started asking poor farmers in the Darfur region of Sudan what would help increase the amount of land under production, tractors were clearly not a sustainable option. It turned out that many of the poorest farmers were cultivating land by hand because they couldn't afford to keep camels, the traditional draught animals in the area. What would really make a difference would be if a plough were available which could be pulled by a donkey – usually the only motive power available to

Examples of Participatory Technology Development in Practical Action have ranged from actions such as the development of the donkey plough in Darfur, Sudan, in consultation with farmers too poor to own camels - the normal draught animals (above), to the sponsoring of consultations between scientists from South Africa and the UK working on the possible application of nano technology to village drinking water supply filtration and rural communities in Zimbabwe (left).

Case study 3: Forms of participatory technology development (PTD)

them. Hence our long running work alongside farmers in Darfur developing and improving the donkey plough.

Even with Participatory Technology Development however, although there was an element of building people's knowledge and skills, the principle idea was to develop specific technologies as solutions for specific problems: ploughs that would work with donkeys, solar driers that could preserve food, turbines that would generate electricity for small villages. But what about improving general technical skills and knowledge in developing countries? What about improving the technical capabilities of poor women and men so they can make informed choices between different technologies that might affect their lives? What about helping poor people's voices to be heard in national debates on where investment in Science & Technology should be made? That is where some of the emphasis is being placed now in thinking on technology for the poor: on how the whole process of science and technology innovation can be grown and sustained in developing countries and how the process can work more effectively for the poor. An example illustrating this from Practical Action's own recent work was the hosting of exchanges between rural communities in Zimbabwe and scientists from the UK and Southern Africa on the potential for nano technology in the field of rural water supply filtration in 2007[71].

These four phases aren't mutually exclusive with each one completely eclipsing the next. There will still be occasions for technology transfer from the developed world, as the mobile phone story demonstrates to an extent today. There's certainly still plenty of need for participatory technology development. But building technological capabilities will be critical if local capacity for innovation is to be grown and if we are to avoid unintentionally developing inappropriate technologies that fail to find widespread use in working for the poor and for a more sustainable future.

4.4.3 Barriers to dissemination

In addition to factors acting against pro poor technology innovation there are also barriers that discourage or prevent technologies that could be useful to the poor from being adopted on a wide scale. These include:

Poverty and limits to choice:
Affordability is critical to the widespread adoption of new technology. If either capital or recurrent costs are too high they may place a new technology beyond the reach of those who would benefit from its use, be it in the form of inputs (e.g. seeds and fertilizer), tools and equipment (e.g. ploughs) or services (e.g. transport).

Poor people (particularly poor women) generally have fewer years of formal schooling than better off groups. The resulting low literacy and numeracy levels limit their access to the knowledge and information they need to understand the technology options available. As a report for DFID by the Centre for Economic Policy Research notes[72]: "the inability to read and write restricts the ability to follow signposts, understand medicine labels and machinery instructions, confirm commercial transactions, avoid being cheated, *etc*. People need access to information regarding health, education and the market economy, so that they can engage critically with the issues and institutions that

affect their everyday lives."

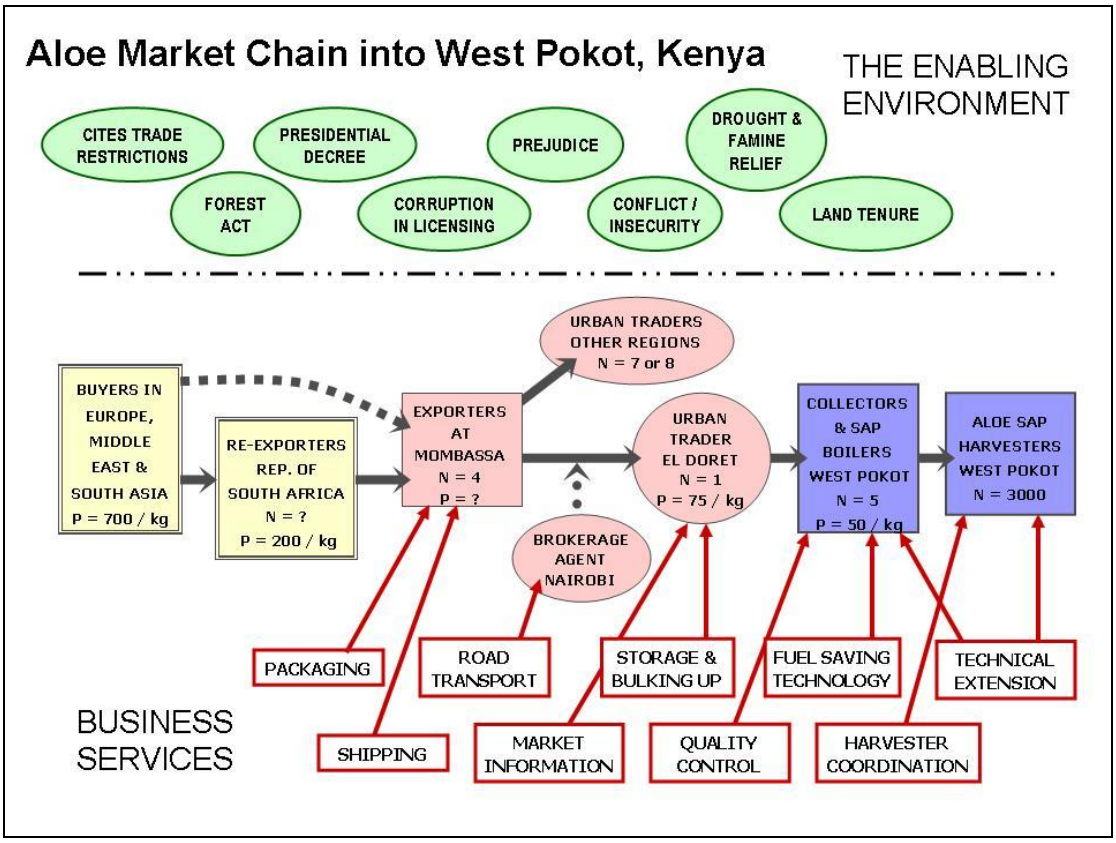
Trying new technologies out also requires an appetite for risk (will this work? will the return be greater than the investment?). For people whose resource base is already marginal, the consequence of taking a risk and loosing may be so great as to make the risk untenable, even though it may not seem so great to some one with a better resource base and more 'margin for error'.

The limitations of markets

Modern economic theory holds that markets and 'market forces' are an effective way of ensuring scarce resources are utilized in the most efficient manner, by creating the conditions that ensure they flow towards the activity that generates the highest return. Some of the challenges of poverty are truly daunting in scale – half the world's population without basic sanitation for example – and require resources to be allocated with the utmost efficiency if they are to be addressed in the near term. Indeed addressing a problem such as sanitation is often to be thought beyond the ability of public finances alone and require instead market based approaches and the application of private capital. The case of the mobile phone mentioned above is often quoted as an example of how private capital and markets can be a good way of spreading technical innovation (which benefits the poor) quickly. In reality however, markets are complex systems with many actors and environmental factors that influence how value flows along a 'market chain', as can be seen from the market map from East Africa in case study 4 overleaf. These 'actors and factors' can all affect where private (and public) capital are applied and where and to whom value flows from those investments. From the perspective of poor men and women there are thus multiple factors affecting whether markets lead to technological innovation which benefits them or, conversely, whether the poor can gain viable livelihoods from market-based activities.

For many basic services it is likely that market systems will only function effectively if there is a significant input from the public sector to offset the lack of purchasing power poor consumers have and the negative impact that has on attracting private capital. One has only to look at the international market for drinking water concession contracts in the developing world in the 1990's to see this on a large scale. With the exception of South Africa almost all the contracts awarded were for urban populations. Rural populations are generally too costly to serve and too poor to pay enough to provide for an attractive return for an international water company and, as a result, existing technical options were prevented from being applied and investment in innovative alternatives failed to materialise.

Global trends also have an impact on technical choices. Many countries have the technical capacity to grow sufficient staple crops to feed themselves. But the opening up of economies has led to countries being encouraged to specialise not in staple foods, but in exporting what they can produce cheapest in the context of a global market so, according to the logic, that they can then buy the technical options (or food) they need. The move away from self sufficiency has been further exacerbated by tariff rules and agricultural subsidies provided to producers in rich countries which reduce the cost of importing food into the developing world further. As a result food security policies have changed and local stockpiles have been run down over the years in favour of purchasing what is needed from the global market. Whilst this worked to an extent in the 1980s



The above diagram is a map of the market chain for aloe, a plant extract and sought after component for soaps, shampoos and hand creams. The market chain spans from poor producers (around 3000 aloe sap harvesters in West Pokot, a division of Turkana in northern Kenya) to the buyers of the raw material operating on behalf of soap manufacturers in Europe, the Middle East and South Asia. The map shows the various actors involved along the chain between its two ends, the role they play, and the value they extract from the product as it moves along the chain, from the Ksh50 per kg paid to the harvesters by the sap boilers to the Ksh700 per kg paid by the buyers in Europe to the re-exporters from South Africa. It also shows the various 'business services' that are required at different points along the chain, the quality of which can affect both the value that actor can extract from their function and the value they can pass down the chain to others. Finally it shows the 'enabling environment' factors which can stimulate individual market chain actors to act in specific ways which, in turn, can affect the efficiency of the chain, where and in what investment is made and, ultimately, the quality and value of the interaction experienced by the poor producer with the market system. For a market system to work in favour of the poor, all of these factors have to be taken into account.

Case study 4: Markets as complex systems: a Kenyan example from Practical Action's work[73]

and 90s in times of cheap food availability on the global market, the policy shift does not look so effective in a climate of rising global food prices, especially when one considers that, over the last 50 years the developing world has shifted from an annual agricultural trade surplus of $1 billion to a food deficit of $11 billion a year[74].

Unequal power relationships

Poor communities are generally less powerful than other groups in society and there are often vested interests of these groups which, intentionally or unintentionally, work against the adoption of innovations which favour the poor.

To take water supply as an example, the reason many of the residents in the slums of Bangladesh's capital city, Dhaka lack access to safe drinking water is not because of the absence of technology – the pipes are often already there, buried in the ground and providing supplies to their middle class neighbours. It is because, as slum dwellers, they occupy informal settlements which are not recognised by government and so are excluded from entering into any form of supply agreement with the Dhaka water utility[75]. Despite their capacity to pay (slum dwellers typically have to buy drinking water from water vendors at a cost of up to 10 times the unit rate middle class consumers with official connections pay the city's water utility), despite the availability of the necessary technology, often within a few metres, and despite their evident need, their lack of formal land tenure rights trumps their right to water and excludes them from access to this most basic of services. Similar conditions exist in slums such as Kibera and Mukuru win Nairobi, Kenya, where Practical Action has been working with local community organisations to win recognition of the right to water (see case study 5 overleaf).

In the field of health, the struggle in South Africa to allow HIV-positive people access to cheap generic antiretroviral drugs and effective care has been well documented. It centred on 2 barriers to poor people accessing the science based technologies (in this case modern drugs) that would help them. The first barrier was the then President, Thabo Mbeki's refusal to acknowledge the link between HIV and AIDs which prevented the South African health service from adequately addressing an epidemic that, in 2007, was estimated to affect 5.4million people[76]. The second barrier was a legal battle in 1998 between the Southern African government and a number of multinational drug companies as to whether a section of the 1997 Medicines Act of the South African Government (designed to allow the manufacture of low cost generic version of anti retroviral drugs) contravened TRIPS rules. A well publicised campaign led by a civil society organisation known as the Treatment Action Campaign (TAC) and supported by international agencies such as Oxfam and the WHO, created widespread sympathy for the Government's legal case and significant amounts of adverse publicity for the 39 drug companies involved, leading to the drug companies being shamed into withdrawing from their court case in 2001[77]. However, even after the legal victory it took a further 2 years and a change of government in 2003 before cheaper anti retrovirals become available, principally because of Thabo Mbeki's stance and the reluctance of the Government to declare the AIDs epidemic as a national public health emergency, which would have then cleared the way for the import or local manufacture of generics under TRIPS anyway. The eventual change of government in 2003 subsequently removed this second political barrier, leading to a (projected) ten fold increase in the national health budget for HIV AIDs over the period 2003 to 2010[78]. By 2008 nearly half of South Africa's HIV AIDs infected population was receiving antiretroviral drugs, still not ideal, but a big improvement over the situation before some of the cost and political barriers were removed.

Typical lane with open sewer in Mukuru

Practical Action's work in Nairobi in recent years, both in Kibera and Makuru, has led to a sea change of opinion in the Nairobi Water and Sewerage Corporation: from considering informal settlements as a problem of unaccounted water and losses to potential customers who have a right to water and who must be part of its plan to provide all citizens in the city with water and sanitation services. The extent of this transformation cannot be understated and is epitomised by the fact that a new department for informal settlements has been formed by the company, with an MD and engineering and sociologist staff members.

Mukuru is a settlement of 150,000 people of which around 70% have no sanitation and where water supply has been scarce, unreliable and expensive. Conditions in the settlement are very poor – housing made from mud or corrugated iron intersected with narrow muddy lanes often so narrow that you have to pull your elbows in to walk along them. Most lanes have streams of filthy water running down the middle of them and plastic bags and other waste is strewn everywhere because systems of waste collection are non-existent. You have to look carefully wherever you tread as the traditional toilet here is either a patch of open ground or the infamous 'flying toilets' – plastic bags used for defecation then thrown onto the path. Water has to be brought from individuals who have invested in (an often illegal) connection to the mains at the edge of the settlement and who have laid pipes (often along the open sewers) deep into the slum itself.

New water point with water seller in attendance

Practical Action worked with the Corporation to look at ways of extending official water supplies into parts of the settlement from existing take off points from main lines running along the periphery of the slum. The pipes and connections from the take off point into the settlements will be managed and operated by water groups formed by the communities served themselves, with the Water and Sewerage Corporation billing each group for a bulk supply via water meters at the edge of the settlement. The Water Groups will then distribute the water by a mixture of licensed connections to water sellers (who will typically have a reservoir tank and a tap stand from which to sell water by the jerry can) or household connections to those who can afford it. They will also be responsible for running repairs to the mains and for collecting revenue and paying the bulk supply bill to the Corporation. Water sellers will charge a regulated price of around 2 shillings per 20 litres (as opposed to the 5 to 10 shillings charged now by unregulated sellers). The aim of the project is to legalise and regulate existing sellers rather than put them out of a job, and encourage new sellers in to extend services further where people cannot afford household connections. The water element of the project has been a success, although the sanitation element remains a challenge. A senior utility staff member talked of the experience having "opened our eyes to seeing slum communities as people deserving of a service rather than just a problem of unaccounted water to be dealt with".

Case study 5: Power relationships and access to technology – negotiating the right to water in Nairobi

Inequalities of power of course exist not just between different social groups or nations, but also within households. Most obviously men and women have different technical needs and face different barriers to accessing improved technologies. For example, amongst the pastoralist Gabra people of northern Kenya women have traditionally had low status in the community. They do most of the physical work around the homestead and in the provision of food, including house construction at least four times a year, and the making of household utensils and furniture, as well as daily firewood and water collection. All the livestock belong to men, and men make all of the community decisions[79]. Such a situation makes it more likely that choices on household investments in new technologies would favour men's needs over women's, for example by placing a new water point closer to grazing areas than to the homestead.

4.5 Lessons- towards a technology for sustainable development

Technology is inextricably linked to human development, however you define the development goal. The technology choices we make, and the associated systems for innovation and dissemination we devise, will therefore influence how much of a positive or negative contribution technology makes towards us achieving the development outcome we desire. From the above, it can be seen that Practical Action believes that for technical innovation to work in favour of the poor and in favour of a sustainable future for all of us, a number of conditions have to be met:

- Appropriate governance arrangements. There are potential and real governance problems for poor people and developing countries when powers to retain control over technologies which impact on their lives are ceded to others. Inappropriate technology choices can lead to long term adverse consequences for societies, as can the capture of knowledge for private gain through IPR mechanisms. National (and international) science and technology policies and IPR rules need to be framed to take account of the needs of society as a whole and not just narrow commercial interests. Governance mechanisms which include the voices of poor women and men both in policy setting and the on-going assessment of the impact of technology choices is one way of trying to counter these problems.

- Involvement of the poor in technology development. Direct technology transfer can lead to the widespread adoption of a new technology (c.f. the mobile phone), but generally the engagement of poor women and men in technology development is critical to ensuring it meets their needs. Such involvement can range from the most basic market research type of approaches used for many commercial processes, through direct engagement in the development process (e.g. participatory on farm research on crop breeding with small farmers), to engagement in discussions over where national science and technology development efforts should be focussed. Facilitating such engagement requires that a level of technical capability exists within developing countries themselves.

- A role for the State in ensuring pro-poor technology innovation occurs. Market mechanisms will often provide an important path for technology dissemination, but they will not always provide the necessary incentives to drive technology development towards either pro poor applications or applications which impact positively on environmental sustainability. There is a need for the state therefore to play a greater role in either providing the incentives or being involved directly in the R&D work necessary.

- The need to address issues of affordability, capability and power imbalances, i.e. poverty. Availability of a technology itself does not guarantee its use. Issues of affordability, accessibility (in terms of the knowledge required to gain access to and use the technology) and power relations (ranging from in household imbalances between men and women to competing international commercial or political interests) will determine who can use a technology and how widespread its penetration and impact is. These issues are critical to the success of any programme to promote the use of any technical innovation.

In a sense however, although these are the barriers that need to be overcome in order that technological innovation benefits the poor, more fundamentally the challenge is for us to re-think our very relationship with technology. From a justice perspective, we need to rebalance our efforts at technological innovation away from meeting the 'wants' of consumerism towards meeting the basic <u>needs</u> of the 2 billion people in this world who still live in abject poverty.

This is fundamentally a political project. The technologies needed to feed the world and ensure everyone has access to the basic services needed for a reasonable quality of life already exist. It is how those technologies, or the rights to access them, are distributed that needs to change. We have to move from a state of technology <u>in</u>justice to a state of technology justice.

Such a move is in the interests of everyone in the world, not just the poor. Growth of consumption (and by implication the technological innovation that supports that growth) is not, beyond a certain point, increasing the sum total of human happiness. Neither is it offering us a sustainable future. Schumacher saw mass production and its ultimate expression in globalisation, as *"inherently violent, ecologically damaging, self-defeating in terms of non-renewable resources and stultifying for the human person*". He argued instead for a "*technology of production by the masses, making use of the best of modern knowledge and experience,.. conducive to decentralisation, compatible with the laws of ecology, gentle in its use of scarce resources, and designed to serve the human person instead of making him the servant of machines"*. A "technology with a human face". The challenge remains the same today as it was 40 years ago. The urgency however is even greater.

Sustainable Wellbeing – an alternative narrative for development practice.

5 An alternative narrative – setting the scene

In the first two chapters of this document we have argued that, despite advances in development theory, GDP growth and technological advance have continued to be the de facto descriptors used to define 'development' and to inform macro policy and practice. We have acknowledged that growth in income and consumption is still a necessary goal in many developing countries to help establish even basic living standards for all. But we have also shown how the macro economic growth policies being followed in most developing countries today are failing to tackle poverty effectively. We've asserted that the continued pursuit of consumptive growth in the developed world is neither sustainable nor improving quality of life and suggested that a focus on reducing inequality and improving wellbeing might be a more effective approach. Finally we have looked at the critical role technology plays in development. We have cast serious doubt on whether we can rely on continued technological advance to create the levels of carbon efficiency necessary to allow us a sustainable future with no changes to consumption patterns in the developed world. We have also shown how poor understanding of the factors that affect technology innovation have meant that attempts to use technology in the fight against poverty often have unexpected and unsatisfactory outcomes.

In these next 2 chapters we return to the idea of sustainable wellbeing as the central purpose and driver of development.

In chapter 6 we look at different approaches to defining wellbeing and also examine what might be the critical factors affecting its sustainability.

In chapter 7 we then use these ideas to map out the main building blocks of an alternative generic development narrative.

6 Sustainable wellbeing for all as the policy goal

6.1 Introduction

This chapter attempts to use some of the ideas discussed in the first 2 chapters to explore how an alternative development narrative, based on the idea of sustainable wellbeing for all as the primary goal, might look. It starts by reviewing a range of different approaches to describing wellbeing and identifies a definition that is of potential use in development policy and practice. It then goes on to look at the notion of sustainability, as applied to wellbeing. It looks in particular at two related issues - the role technology plays in assuring a sustainable future for everyone on the planet and, more specifically for poor and marginalised communities in the developing world, the notion of vulnerability and how that impacts on the sustainability of their wellbeing.

6.2 Wellbeing defined

NEF's Happy Planet Index discussed in section 3.2.2 of this report uses the concept of happy-life-years and ecological footprint to measure the environmental efficiency with which nations deliver wellbeing to their citizens. As such it is clearly a measure that can be used to assess how close we are to achieving sustainable wellbeing for all. Indeed the green zone in the top left hand corner of the chart in figure 5 is a representation of the sort of scores nations would need to achieve on the numerator and denominator of that index to achieve this goal.

However, the index does not offer much direct guidance as to the sort of policy approaches that would be likely to result in high happy-life-years scores or create the kind of life people value. To do this it is worth exploring the notion of wellbeing a little more.

The Nobel Prize winning economist Amartya Sen's work on defining the components of a standard of living has been one of the most influential attempts to introduce the concept of wellbeing into definitions of development. Sen's work has been highly influential in the development sector and was instrumental in the creation of the UN Human Development Index. Sen rejects the use of happiness as such to define an acceptable standard of living, on the basis that social conditioning can mean that even a very deprived person, who is "poor, exploited and overworked" can still express happiness. Sen concludes that it is morally wrong to label happiness in such circumstances as an indicator of wellbeing[80]. Instead, he argues that a person's wellbeing in a society depends them being capable of carrying out certain key functions (for example feeding themselves, being healthy, having a good job, being safe, being able to appear in public without shame). Functions are the various things a person may value doing or being and it is the capability to carry out these functions in the context of a particular society that defines wellbeing (and a reasonable standard of living) in that society.

For Sen the notion of freedom of choice is also critical to a definition of wellbeing, which is why he focuses a person's capability to carry out key functions as opposed to whether the functions are actually performed. He uses the example of a starving child and a fasting monk to illustrate the point. Both

are failing to perform the function of adequately feeding themselves. But the fasting monk has the capability to fulfil the function and also the freedom to choose not to. He has the ability to live the life he values. The starving child has no choice and cannot live the life she values[81].

Sen's capabilities approach, whilst hugely influential, has been criticised for focussing too much on notions of individual freedom and failing to recognise that one person's freedom to live the life they value may well compromise another person's freedom to do the same.[82] A common example of this in the real world is where there is competition over resources: one person's ability to extract large amounts of water from the ground to irrigate their crop may compromise another's ability to get water to drink for example. The UK Government's Sustainability Commission has suggested the alternative notion of capabilities to flourish being bounded by ecological limits[83], whilst the development academic Robert Chambers has similarly offered the idea of 'responsible well being'[84] to cope with this criticism.

Sen's rejection of the idea that happiness could be relevant to notions of wellbeing has also been questioned. Large scale studies of the way happiness survey responses change over time, such as the 2008 study using data from 52 countries over 26 years by Ronald Inglehart et al[85], show that increasing democratisation and personal freedom in countries does correlate with rising levels of reported happiness. There is also a growing body of academic work, notably from the University of Bath's Wellbeing in Developing Countries Research Group (WeD), that argues for people's subjective experience of their condition being considered as an important component of the measurement of wellbeing[86] and for development policies to incorporate happiness as a legitimate goal[87]. Sarah White of WeD makes this argument in a 2009 paper[88], which is based in turn on the results of previous research by the group into how people in Peru, Ethiopia, Bangladesh and Thailand define wellbeing themselves[89]. White notes that people's definition of wellbeing is different in different contexts but that a common overarching conception can be captured in the pair of phrases in Figure 13. White writes: "*'Doing well – feeling good' is a fairly common formulation for wellbeing …. 'Doing well' conveys the material dimension of welfare or standard of living, suggesting a foundation in economic prosperity, though it need not be limited to this. 'Feeling good' expresses the 'subjective' dimension of personal perceptions and levels of satisfaction. The second line 'doing good – feeling well' reflects more specifically the findings of our research in developing countries. This made clear that the moral dimension, often bearing a religious expression, was extremely important to people. For many of the people we talked to, wellbeing was not simply individual preferences, but values grounded in a broader, shared understanding of how the world is and should be. At face value, the final phrase, 'feeling well' indicates the importance of health to wellbeing. However, it goes beyond this to an again moral sense about feeling at ease with one's place in the world – which is critically associated with how one is in relationship to others."*[90]

Figure 11: Conceptualising Wellbeing

Time and again Practical Action sees through the projects it supports that it is not just the material benefits that people value, but also the change in their status in the wider world and their increased capacity to take more control over their own lives, as these examples show:

In Nepal, Kaman Singh, at an early age of 22, joined the Maoist rebel army to fight for, what he thought would be, his right to live a dignified life, better opportunities for his family and a way to move out of poverty. The decade long war, with a death toll of over 14,000 people in Nepal, has now ravaged his village of Sanani in remote Achham District. Upon the signing of the comprehensive peace agreement (CPA) in 2006 and the resulting cessation of active conflict, Kaman's life had changed for the worse. Ostracised by his communities and blamed for the atrocities committed during the conflict period, Kaman and his family were marginalised from the community.
In 2008, the SABAL project initiated its peace building activities in Sanani village. Kaman was one of the first to participate in the inception meeting and also the first to show interest in the leader farmer training being offered by the project. With his past experience in farming, secondary level education and upon completing the two weeks course of agriculture technology, Kaman is now a leader farmer providing valuable technology inputs and farming advices to his community. But as Dil Bahadur Air, a SABAL project beneficiary and farmer from Sanani noted: *"It was hard for us to trust Kaman Singh in his new role. We have always associated him with violence. But he is a changed man now and provides us services that we would normally not get in this remote village."* The transformation was not easy and it took a while for him to build back his relationship. *"I have realised that it was very easy to destroy things (referring to relationships) and hard to build them back. But today things have changed and I am accepted by the community.,"* he expresses[91].

From Kasaala in Sudan Eastern Sudan Fatema Mohammed Ahmad, a former refugee from the conflict in Southern Sudan, talks of the impact of some skills training and access to a small loan to set up a business and build a house made to her life. She explains how the resulting income and secure shelter meant she could afford to look after her two children and bring them back to live with her rather than leave them in the care of relatives. But she also talks about how her new found independence has gained her respect in her community: *"I became a decision maker in my community; source of power to other poor widows and single women and highly respected by men. I have been selected in many committees and my words are valuable when interfere to solve any disputes; I won the love of my community[92]".*

In the Canchis province of Cusco, Peru, 42 year-old Rebelina Tijeras Salas has gone through a year of studies in the Alpaca-raising Kamayoq School which Practical Action supports. Now working as 'Kamayoq' and providing advice and simple animal health services to farmers she recognises the benefits her new skills are providing both in terms of an income for her family and in terms of the improved health and value of the stock owned by the farmers she advises. But, she also focuses in on the very personal change the training she received has had on how she relates to others in her community: *"It has been a great change for both my family and my sector". "This has helped me develop, to feel more inclined to participate and to be valued not only for who I am but for what I know"*[93].

Sushmita Chaudhari lives with her husband and her extended family of 11 members in Ghodsuwa village in Kailali district, Nepal. They own around 1,600 square metres of land which is their main source of income but is not enough to sustain their livelihood. Due to shortage of year round food supply, her family had to also cultivate land for larger landowners on a crop sharing basis. Susmita explains: *"The income from our land and landowners land was not enough, hence, male members of my family including my husband started working on a daily wage basis,"* Following a programme to help Sushmita improve her horticultural and marketing skills and gain access to additional land through a leasehold arrangement, Susmita was able to radically improve her household income: *Last year alone, I earned NRs 50,000 (£434) from 2 kaththas of leased land. With the money I purchased a brand new computer for my husband who is now pursuing a diploma in computer science in Dhangadhi. I am so happy for him,"* she says. But once again it's not just these material benefits that are important to Susmita and her family. Susmita's family members proclaim that the extra income has been great but, additionally it is important for them that they have also gained respect in their society. Susmita's family is happy that they are not beholden to a sharecropper landlord anymore and that they don't have to knock his door for money or share their crops with him[94].

Case study 6: People's perceptions of the importance of the changing quality of relationships as a success indicator of projects

White notes that the idea that relationships are critical to a sense of wellbeing is strongly backed up by the results of standard happiness surveys and numerical indices of wellbeing that correlate "*low quality of life with social exclusion and personal isolation and high quality of life with social connectedness"*[95]. Interestingly this idea also ties back very much to elements of Schumacher's concepts of Buddhist economics and right livelihoods, which saw social connectedness as a key to a meaningful life and actions which promoted such relationships as a desirable purpose of economic and development policy. Practical Action's own engagement through projects also confirms that people often focus on the

change in quality of relationships, either within the household or between the household and the external world as a reason why an intervention might be viewed as a success, as the examples in the box containing case study 6 shows.

Based on its research Bath University's WeD centre has developed a framework for looking at wellbeing in development practice based on 3 dimensions – material, relational and subjective. The relational is further broken down into human (relations primarily within households) and social (primarily relations to the outside world). This is summed up by White as a

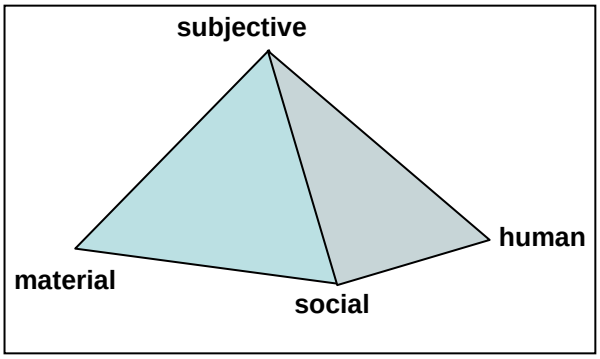


Figure 13: The components of Wellbeing

The *material* concerns practical welfare and standards of living:

- Objective aspects
  - Income levels; housing quality; tenure status;
  - Employment and livelihood opportunities
  - Availability of information and communications
  - Availability / quality of services and amenities: water, sanitation, electricity, credit, shops, schools, clinics, hospitals, sports centres, play areas, places of worship
  - Infrastructure and accessibility (e.g. public transport)
  - Quality of environment
- Subjective aspects
  - People's satisfaction and perceptions of these

The *social* concerns social relations and public goods:

- Objective aspects
  - Community formation: main majority / minority groups; in/out migration; lines of solidarity / conflict
  - Organisational belonging: churches, mosques, temples, clubs, sports, political parties, gangs, action groups
  - Informal association where (different groups) get together
  - Community relations with the state – law, politics, welfare
  - Violence, crime and (in)security
- Subjective aspects
  - People's satisfaction and perceptions of these
  - Experience of collective action

The *human* concerns capabilities, values and attitudes:

- Objective aspects
  - Age distribution, health status, education levels
  - Household composition / stability
- Subjective aspects
  - Understandings of 'a good community', a 'good society'
  - Community self-concept
  - Community fears and aspirations
  - Levels of (dis)satisfaction
  - Trust and confidence in each other
  - Sense of alienation or connectedness with wider society

Figure 14: Aspects of Wellbeing at a Community Level

pyramid, as shown in figure 13. The pyramid shape is used to emphasise the interdependence of the different elements of wellbeing and how none can exist without the others. The base of the pyramid is supposed to represent the objective and externally verifiable elements of wellbeing, whilst the apex reflects the fact that a person will also have their own subjective experience of each element. The WeD framework goes on to give examples of the different elements of wellbeing at a community level as per figure 14 above[96].

White notes there are similarities between this framework and the sustainable livelihoods approach, which tries to understand the practical realities and priorities of poor men and women – what they actually do to make a living, the assets (or forms of economic, natural, social or human 'capital) that they are able to draw on and the problems that they face in doing this. The significant difference between a livelihoods approach and an approach centred on wellbeing is that the latter seeks also to take account of people's subjective experience, both because it is an important measure of wellbeing and also because that subjective experience itself can be both an outcome and an input (so someone who experiences high levels of wellbeing may be more disposed to altruistic that would, in turn, increase the wellbeing of others).

Interestingly, we know that improvements in relationships are not just desirable outcomes of projects that will help improve the relational aspect of wellbeing of individuals and households. In addition, improved relationships between poor men and women and other groups are often critical inputs required before improvements in material wellbeing can occur. For example, our experience of working with markets indicates that it is the quality and nature of the relationships between poor producers and other actors in a market chain that influences whether and by how much they benefit from any interaction with a market system, as an example from Practical Action's work in Nepal, written up as part of a best practice document for USAID[97] shows in case study 7 below:

The opportunity for dairy farmers in this western district of Nepal appears to be significant: A large processing plant that recently opened is desperate to buy milk, struggling to meet even 10 percent of requirements to operate at capacity. But the problems facing dairy farmers are many and varied, issues affecting milk quantity and quality such as fodder shortages and animal health and husbandry, and infrastructure and transport difficulties. In addition, Nepal is emerging from a long conflict and relationships tend to be fragile or non-existent.

It is reasonable to question whether participation is a good option in the face of such a complex and challenging situation, especially since the (Practical Action) project team primarily wanted to get information so they could design a program for donor funding. At this stage they were less concerned with getting market actors to build relationships. Yet providing an opportunity for interaction meant that communication was inevitable. Initially, farmers and traders exchanged barbs about milk prices, but the facilitators were patient (and refrained from too much interference) and found that the dialogue transformed when one of the milk processing firms began to discuss areas of concrete collaboration—specifically, how they could provide a chilled collection facility (if the farmers became more organized) and veterinary services. The team learned that this sort of dialogue just needs the right conditions and opportunity: After the end of the workshop they observed a group of farmers discussing terms and conditions intently with a buyer. They concluded that market actors can find their own solutions if given the chance.

Case Study 7: Improvements in the quality relationships between poor producers and other market actors as a pre condition for markets working for the poor.

To summarise, there have been long academic debates on how, in practical terms, the notion of well being could be used as the principle driver of development. Tracing this debate through Sen and the literature on happiness, and drawing on more recent work by Robert Chambers and Sarah White at Bath University, as well as our own experiences, Practical Action concludes that people's perception of wellbeing is made of two components:

- A material concern – that a person's basic needs – food, shelter, access to basic services such as water and energy, education and health, and an income to pay for all of this – are met.

- A relational concern - a sense that you as an individual have a degree of control and power over your own life, that you can be a part of decisions that have a major impact on the way you live, that you can live in dignity, that you have the respect of your fellow citizens, and that you can live in peace with your neighbours.

This is incredibly important because it means if we are to focus on wellbeing as the primary purpose of development, it's not just what we do that's important, but how we do it as well. In order for people to gain a sense of wellbeing they cannot just be passive subjects of development but have to be active participants in it.

6.3 Technology Justice – the role technology plays in sustaining wellbeing for all.

We live in an environment that is, in effect, a closed system. We take resources from that system, we use them, and we return a certain amount of waste to that system. The capacity of the system to sustain a level of exploitation is physically limited (a) by the finite availability of resources (either in absolute terms, such as minerals in the earth's crust, or relative terms such as the rate at which energy from the sun arrives at earth) and (b) by the rate at which the system can receive and convert toxic waste into harmless products (or new resources).

The technologies (knowledge, skills, tools and systems) that we develop allow us to interact with and fashion things from the material resources available within this closed (eco)system. Our forms of governance, in the widest sense - the way we structure societies, distribute power, vest ownership of resources, create rules and systems (from religious beliefs through to economic policies and the terms of international trade) – dictate which technologies we develop and use.

The physical limitations of the system were not material whilst the global population was relatively small. But as the forms of governance and the technologies we have produced have become ever more complex, and supported a phenomenal rise in population, the capacity of the system to either provide resources at the rate required or to absorb the waste products from their exploitation has become a limiting factor.

We are now at a crossroads, summarised by the diagram overleaf. We can go in one of four directions, depending on how we manage our interaction with the

environment through our systems of governance and the technologies. Three of those ways lead to 'disaster' outcomes.

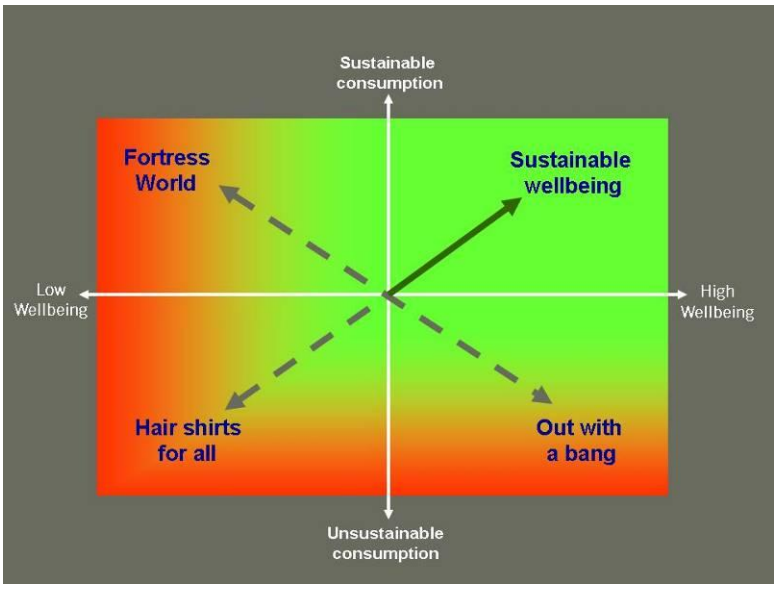


Figure 12:
The inter-relationship between technology, governance and environment and its consequence for well being

1. We could focus our governance systems on ensuring everyone gets access to the technologies (and therefore the consumption patterns) currently enjoyed in the industrialised world. But as the World Wildlife Fund amongst others has shown, we would need between 2 and 5 planets' worth of resources to sustain this, so this could be considered the 'going out with a bang' option – a high standard of living for all for a short period followed by environmental collapse.

2. We could focus solely on improving our governance systems to ensure everyone in the world has an equal share of the remaining natural resource base of the planet at a rate of exploitation that is ecologically sustainable. But without significant improvements in technologies and the efficiency with which we convert those resources into goods and services, this would mean a significant reduction in standards of living in the developed world and lower expectations in the developing world (the hair shirts for all option).

3. We could continue to focus inwards on own national interests and effectively ignore our governance obligations to others, with those who have access to advanced technologies using them to further their own interests. As competition over remaining resources and pollution rights becomes ever more intense this scenario evolves into a 'fortress world' with the more powerful countries using military and economic power to maintain resource flows to their populations and find outlets for their waste (this is not such an outlandish outcome when one considers the long term conflicts over oil in the Middle East, the recent spate of attempts by richer nations to buy up agricultural land in the developing world to ensure future food supplies and increasing incidences of toxic waste being exported from rich countries for disposal in poor ones).

The above are all 'disaster scenarios' in the sense that they result either global ecological collapse or global political collapse, with the latter producing a highly insecure and unpleasant world. If we want to avoid such scenarios we have to aim for a 4th way in which our governance systems and our use of technology are both clearly focussed on radically improving our and future generations' ability to live within our ecological means whist reducing inequality and promoting wellbeing globally. Practical Action sums this up in the principle of Technology Justice, which it defines as:

> *the right of people to decide, choose and use technologies that assist them in leading the kind of life they value without compromising the ability of others and future generations to do the same*

The principle of Technology Justice is also clearly in line with NEF's HPI approach recognising both the 'happiness' element of the index (helping people lead the kind of life they value) and the ecological footprint side of the equation (without compromising the ability of others and future generations to do the same).

Sustaining wellbeing requires that technology is developed and used in accordance with the principle of Technology Justice.

If that all sounds too academic, a simple example should help. Official aid for agriculture, meant to address the problem of growing enough food to feed the developing world, by and large deliberately ignores small farmers on less fertile lands and instead focuses on commercial farmers on the most productive areas and on the use of large scale industrial technologies – fertilisers, pesticides, mechanisation, and new crop breeding techniques such as GM. Practical Action believes this approach is wrong. In sub Saharan Africa 60% of the population rely on small scale subsistence farming for a living. Focussing resources on the most productive lands and on commercial farmers therefore denies 60% of the population the help they need to improve the efficiency of their farming methods. And focussing on industrial farming technologies, we believe, also compromises soil fertility and reduces the ability of future generations to feed themselves.

Practical Action takes a different path. We support small farmers. We recognise that with often quite simple improvements they can increase their production many times over and create surpluses. Building on what they already do, we promote technologies which are described as agro-ecological – which build soil fertility and moisture retention and which improve farmers' capacity to grow food in the future. In other words, using an approach based on the concept of technology justice, we help small farmers use technologies which allow them to continue to live the life they value without compromising the ability of others and future generations to do the same.

6.4 How vulnerability impacts on the sustainability of wellbeing

In section 6.3 above we have already looked at wellbeing from the perspective of social and ecological sustainability (the ability to live a life one values without compromising the ability of others and future generations to do the same). But there is another element sustainability which is not about whether there is

enough 'pie' to go round or whether the slice you have is fair relative to other people's slices, but whether you can hold on to your slice of pie once you have laid your hands on it.

A state of poverty is not necessarily a static phenomenon. People may move in and out of poverty as a result of seasonal stresses (for example those unable to store sufficient food may suffer hunger during the lean season immediately before a harvest, whilst the income of people reliant on agricultural labour for a livelihood will fluctuate according to the season). Also, people experiencing the sudden shock of a disaster, conflict or the slow progression of environmental degradation may lack sufficient assets or alternative livelihood options to cope and, as a consequence, move from positions of coping to conditions of extreme poverty (see example in case study[98] 8 box).

The sustainability of a state of wellbeing is therefore not just related to the material, human and social concerns being met now but also to the vulnerability of those elements to future shocks or seasonal changes. It is the robustness and diversity of the material, social and human capital that a person has access

A quote from a farmer forced from relative affluence to poverty in a Practical Action case study illustrates that ideas of vulnerability and resilience are critical to sustainable wellbeing:

"The life of many people like me, who are living in flood-prone or low lying areas, is full of uncertainty, unstable and painful", said a sorrowful Mr. Solaiman a 54 year old poor villager of Goghat village in Gaibandha district, Bangladesh.
"I was a good farmer producing crops on 230 decimal of cultivable *Char* (small island) land and had 5 cows. This was sufficient to maintain my family with joy and happiness." But he lost all his land and possessions due to frequent floods and erosion. He has become a landless day labourer with earnings of less than 50 pence a day. He could no longer manage two square meals a day for his wife, seven children and himself. "Many days pass without food".

Case study 8: Vulnerability to disasters in Bangladesh

to that determines whether he or she is vulnerable or not. Development initiatives which seek to build material and relational capital and which seek to

open up rather than narrow down livelihood choices stand the best chance of building people's, communities' and institutions capacity to adapt to future (and often as yet unidentified) challenges and therefore reduce or remove vulnerability.

This idea of adaptive capacity is perhaps best illustrated in the context of adaptation to climate change. Jonathon Ensor and Rachel Berger note in their book 'Understanding Climate Change, lessons from community based approaches[99]' that although the theory of global warming is widely supported by the scientific community, there remains a significant degree of uncertainty as to the extent of the changes likely to happen. The IPCC model that predicts a 4 degrees C rise in global average temperature at the end of this century under the worse case carbon emissions scenario also predicts that this could be as low as a 2.5 degree rise or as high as a 6.5 degree rise. And when we look at rainfall predictions the picture is even less clear. Models for East Africa for example currently cannot agree whether annual rainfall will go up or down by the end of the century in some seasons under a fixed carbon scenario.

Although some things have greater certainty (melting glaciers or rising sea levels – though even here there is uncertainty about rates of change) – the big thing about adaptation to climate change is we don't really know what we're adapting to! As we don't know how climate change will play out in the future and we can't predict all the hazards that are likely to occur it is then important to build capacity of individuals, communities and institutions to identify and develop their own responses to future as yet unknown hazards. A participatory seed breeding programme with collaboration between farmers and agricultural researchers would be a good example of this concept being absorbed into general development practice, where farmers build the capacity to select and breed seeds to respond not just to current changes in climate but to as yet unforeseen future ones as well, when they occur. Collaborations between farmers and meteorological offices to improve seasonal forecasting and the capacity to interpret and act on such forecasts likewise creates capacity useful to cope with future as well as current stressors.

6.5 Wellbeing and thinking in terms of systems

A recurrent idea underlying much of what has been discussed in the first 4 chapters of this document has how interconnected things are and the need to think systemically about the challenge of development.

The focus of economic policy on a single driver – the growth of consumption - cannot deliver sustainable development and wellbeing for all because it renders important parts of the 'system' we rely on for life – the ecology of the planet – as 'externalities' that are outside the frame of analysis. Only by considering our relationship with that system can we develop a model of sustainable development that balances our extraction of materials from that ecology and our return of waste products to that ecology, with its ability to continue to function to maintain life. Also, a growth based driver for economic progress will not reduce poverty unless the factors that influence how that growth is distributed are understood and taken into account.

Wellbeing cannot be measured simply in terms of confirming access to a list of basic services and the provision of a good job. People's power over their own destinies, their ability to make meaningful choices in their lives and to find dignity and respect in their relations with others are all also critical components of wellbeing and the way services are delivered and livelihoods built has to take this into account if this is the principle development objective.

We use technology to manipulate the environment and ecology we live in and, increasingly, to mediate relationships with each other. Technological innovation is a major component of development but, as the discussion in chapter 4 showed, development *through* the use of technology means thinking beyond a particular technical innovation to understand how power and control over a wide range of contextual issues – R&D agendas, IPR regulations, finance flows, technical capability, market systems etc. affects the likelihood that an intervention will or won't make a positive difference in terms of reducing poverty. Returning to the principle of Technology Justice, we also have to understand how my use of technology to live the life I value will impact on the capability of others now, and in the future, to do the same.

All these are examples of why systems based thinking, an approach that tries to understand the context in which any particular development effort takes place and the complexity of the relationships between the various actors involved, is critical to improving the chance that an outcome will be a positive one for poor people.

7 Elements of an alternative narrative

Chapters 2 to 6 of this report provide the material to sketch out an alternative narrative of development, firmly rooted still in the thinking and philosophy of Schumacher, Practical Action's founder, but updated to take account of the experience of the intervening 40 years since Small is Beautiful was published. The narrative draws on sustainable livelihoods approaches and recent work on wellbeing in development practice, as well as the practice and experience of Practical Action itself over the past 40 years. It recognises the critical role technology has to play in mediating our relationship both with the environment we live in and with each other and, consequently, on both the existence of poverty and the ability of humanity to find a sustainable future.

Its key elements are as follows:

Sustainable wellbeing must be the principle goal of development

- The principle goal of development (and therefore the purpose of all forms of governance) must be to promote sustainable wellbeing for all – the ability of all individuals and groups to live the lives they value without compromising the ability of others, now and in the future, to do likewise.

A focus on wellbeing means acting as if people matter.

- A focus on wellbeing involves prioritising the consideration of both people's material and their relational concerns (6.2 above).
- People's material concerns relate to access to amenities (water, sanitation, energy, transport, housing etc) and basic services (e.g. hospitals, schools, credit institutions, insurance / safety nets). Ensuring people's capabilities to meet these basic functionings is also critical to creating the necessary pre conditions for economic growth that is more distributed and pro poor (3.4.1 above). Material concerns include the establishment of sustainable livelihoods.
- Alongside material concerns, an approach focussed on wellbeing also addresses relational concerns. This involves the building of social capital – the creation and strengthening of ties between individuals, communities and institutions that is so important to reduce marginalisation and increase the opportunities to flourish. This means a wellbeing centred approach is as much about the way things are done as what is done. Services and amenities need to be delivered and livelihoods established in a way that gives people the opportunity for meaningful choice and therefore the power to exercise control over their own lives, to live in dignity and have respectful relationships, both within households and with the wider world.
- An approach focussed on wellbeing also recognises the importance of understanding people's subjective experience of all of this and allowing for the fact that this will differ from one environment to another and also between social, ethnic, age and gender groups. Involving people in decision making wherever possible, through the use of participatory approaches, is a way of trying to take account of some of this variability and subjective experience. But considering the quality of relationships as well as the quantity of them is also important. In Schumacher's parlance, it's not sufficient to provide someone with a means of making a living. The livelihood needs to go beyond providing income and help to

integrate that person more closely into the society in which they live – not just a livelihood but a Right Livelihood.

- From this flows a principle of subsidiarity. If people's power and control over their lives is a critical part of a sense of wellbeing, and if relationships between people and between people and the institutions that affect their lives is important, then keeping decision making processes as close to those affected by them as possible makes sense. Subsidiarity as a principle does not mean we should abandon all aspects of national, regional or global interaction but that, wherever there is opportunity for a choice between doing things centrally or locally, the local should be favoured over the central.

Sustaining wellbeing for the poor requires a permanent reduction in their state of vulnerability

- Sustainable wellbeing implies, amongst other things, a permanent move out of poverty. This is only possible when people's vulnerability to changing circumstances and the forces that can push them back into poverty is removed (section 6.4 above). The concept of adaptive capacity (the ability of individuals, communities and institutions to adapt and thrive under future and as yet uncertain scenarios) is useful in this respect. Although adaptive capacity was mentioned in the context of climate change in 6.4 above, it has wider potential application. Adaptive capacity can also be about building technical capacities of communities and local institutions to innovate and to be able to indentify a range of other hazards and to shape their own responses in the future. Adaptive capacity is strengthened if development focuses on widening the choice of options (diversity) to cope with an uncertain future rather than narrowing it – spreading risk rather than putting all the eggs in a single basket.

Technological innovation that is in line with the principle of Technology Justice is critical to ensure a sustainable, fair and just future for all.

- The systems of governance we develop and the technologies we create and use will determine whether we can find a sustainable future within the carrying capacity of the ecology we inhabit and whether that future will involve wellbeing for some or for all. This implies that our development and use of technology has to comply with the principle of Technology Justice, namely that the right of people to decide, choose and use technologies that assist them in leading the kind of life they value without compromising the ability of others and future generations to do the same (see section 6.3 above).
- The concept of technology justice requires a rethinking of how, both in the developing and the developed world, we encourage and nurture technological innovation that has social value and is environmentally sustainable. Engaging more people (especially poor women and men) in national debates around science and technology policy is important (Section 4.4.2 above), as is giving people a say in how technologies which will impact on their lives are developed (Participatory Technology Development).
- Technology justice also requires us to understand and adapt the current drivers that power technological innovation. We need national science and technology policies, state research funding, tax regimes and international trade agreements and regulations to value and foster

collaboration and open source approaches to R&D and to favour these over processes based on competition and the capture of intellectual property rights where it is clear the former will provide greater social and environmental benefits. Only by doing this will we develop systems of innovation that not only deliver new and powerful science based technology solutions to some of the major problems the world now faces, but also be able to fully harness the power of existing indigenous knowledge (including that which cannot be commoditised and so is undervalued by the current system) to contribute to that goal (section 4.4.2 above).

A systems based approach is required for macro economic and development policy

- The above constitutes a systems based approach to macro economic and development policy and an alternative to an over reliance on a narrow selection of indicators, primarily the growth of consumption, as both the definition and the driver of development.

The alternative narrative and Practical Action

8 The narrative in practice

Having discussed the failings of conventional wisdom and practice in relation to development in the first section of this document and having developed the framework for an alternative development narrative in the second section, this final section intends to look at the narrative in relation to Practical Action's own work and to its founding philosophy.

Chapter 9 looks at Practical Action's role in relation to the narrative and the implications of the narrative for what we do and how we do it. It also raises some areas where the narrative challenges us to do better.

Chapter 10 finishes with a look at the wider challenge ahead for Practical Action to see its alternative narrative adopted more widely in practice.

9 The alternative narrative and Practical Action's work

This chapter looks at how the ideas in the narrative should help Practical Action better define the greater cause to which it contributes, define its role in that cause, and shape the way it works.

9.1 The cause Practical Action contributes to

We have shown that the possibility of a sustainable future for everyone on the planet, whether they are citizens of a developed or a developing country, depends on the ability of the world to shift from a broken system of economics supporting materialism and inequality to an alternative focussed on achieving sustainable wellbeing for all. Developing and using technology in line with the principle of Technology Justice will be critical to achieving such a change.

Although Practical Action's sphere of work relates to the relief poverty in the developing world, we should see our work as contributing to a wider movement for change across rich and poor nations alike, which uses the ideas of justice, equality, wellbeing and sustainability that dictate what we as Practical Action do and how we do it, as drivers of solutions not just to the problem of poverty in the developing world, but to how we are going to find a sustainable future for all of us on this crowded earth.

9.2 Practical Action's role

Practical Action's role in this greater cause should be to use these ideas to help fight poverty in the developing world.

Based on the above analysis, Practical Action believes that technology can be a major driver of development, but that currently technology is used primarily to support materialism and inequality in an unsustainable world.

This needs to change if the 2 billion people living in absolute poverty today are to be helped to a better life.

We need to move towards a state of Technology Justice. This means poor people having greater control over and greater ownership of technology, how it's developed and how it is used. It also means focussing on technological innovation that is sustainable and human in scale. Only by doing this are we likely to bring an end to poverty and achieve a good level of wellbeing for all of mankind.

Practical Action can play a critical role in bringing this about by helping to create the conditions for Technology Justice to occur and by helping poor men and women use technology to achieve sustainable wellbeing.

9.3 How the narrative should shape Practical Action's work

The above narrative should (and does) influence what Practical Action chooses to work on, how it chooses to work and, ultimately, has to provide the mission and the values that underlie all that it does.

9.3.1 Technology focus

Practical Action supports technological innovation that helps establish the material wellbeing of poor men and women. At the moment we do this by focussing on the role technology can play in providing access to basic services such as water, waste, sanitation, energy, housing and transport, securing food supplies and developing sustainable livelihoods and incomes for the poor.

We believe that poor people should be in control of their own lives (see 9.2.2 below) and so promote technological innovation that is likely to support this. Generally that will mean technologies that are 'human' in scale and that can be understood, managed and sustained locally. Where it is more likely to promote local control and sustainability we favour technologies that are small and simple over the large and complex, those that can be managed locally over those that have to be managed centrally. We recognise there will be exceptions to this – we acknowledge that technologies such as mobile phones and solar panels are used by the poor but require complex, large and centralised manufacturing processes and that in urban areas that poor consumers will still need to be connected to large scale mains water supplies, for example. But our default position should be to promote technologies that are simple and human in scale, as a counterweight to conventional (unsustainable, unjust and undemocratic) wisdom, which does the opposite.

Our concern that wellbeing is not just transient but sustained should lead us to pay particular attention to reduction of poor women and men's vulnerability to disaster and long term environmental change – enabling people to move from vulnerability to resilience and from the ability to cope with existing challenges to the capacity to adapt to thrive in future, as yet unknown circumstances. This does not yet occur in all of our work.

As we recognise that there are a multiplicity of factors that affect whether technological innovation actually has a positive, neutral or negative impact on the lives and futures of poor people, we should take a systems based approach to our work. The most obvious example of this in our work at the moment is that on making markets work for the poor (see section 4.4.3), but again we need to see this systemic approach be extended further in all of our analysis.

9.3.2 Poor people taking control

Practical Action recognises that people's sense of wellbeing is not determined entirely by their material condition but also the nature of the relationships they have with others and the degree of power and control they have to shape their own lives. At the centre of Practical Action's approach therefore there must be a participatory method which brings the voice of poor women and men to the fore in decision making processes which impact on their lives and builds relationships of respect between them and institutions who can affect those decisions. Examples of how this could happen in practice have been included

throughout this text, including:

- Helping poor people secure the rights to manage and control the natural resources from which they derive their livelihoods (case study 1)
- The introduction of participatory methodologies to make sure poor men and women's voices are heard and needs included in the planning of municipal basic services (case study 5), the setting local authority budgets, or the development disaster risk reduction plans.
- The use of participatory market chain development methods for giving poor producers a voice in a market chain (case studies 4 and 7).
- The use of participatory technology development approaches (case study 3) to ensure technological innovation is appropriate to the needs of those most marginalised by society.

Beyond this however is also a sense that it is access to and control over knowledge that leads to people having power and control over their own destinies that drives much of Practical Action's work. This has to be a common thread throughout all of our efforts, whether it's in the work on building communities' and individuals' technical and organisational skills that unpins many of our projects, or the efforts to 'bridge the first mile' and make appropriate technical information and knowledge available in formats that can be understood and used by local people and development practioners through Practical Answers, or in our attempts to promote and sometimes conserve indigenous knowledge (case study 2) that has the potential to be helpful in ensuring sustainable wellbeing for all.

9.3.3 Practical Action's mission and values

The above is in line with Practical Action's current stated mission:

> To use technology to challenge poverty by:
> - building the capabilities of poor men and women,
> - improving their access to technical options and knowledge, and
> - working with them to influence social, economic and institutional systems for innovation and the use of technology

However, our recognition of the political change that is necessary to achieve Technology Justice suggests we could make more of the 5 core organisational values expressed in our current organisational strategy when we explain ourselves to others. Those values are as follows[100]:

> Justice
> Everyone, irrespective of gender, age, ethnicity or ability, has basic human rights, including access to an adequate standard of living, health and education. People should have the means and freedoms to achieve their rights, including being able to choose which technologies they use.
>
> Democracy
> Public involvement in decision-making, including decision-making about the technologies that affect their lives, is more likely to ensure developments meet their needs and protect them from harmful impacts. Democratic decision-making in all walks of life is necessary to ensure effective social

control of scientific research and that technological innovation is in the public interest.

Empowerment
People living in poverty should drive their own development. Practical Action concentrates on what matters most to the people with whom we work, respects their rights, and supports their own efforts to improve their well-being.

Diversity
Practical Action values all forms of diversity. Diversity of culture and diverse livelihoods are a source of economic strength. Biological diversity and a diversity of approach and method helps people to adapt to change (including climate change). Diversity reduces risks and enhances the flexibility of people's responses, making it more likely that individuals' and communities' needs will be met.

Sustainability
For the long-term well-being of people and planet we must waste as little as possible and recycle wherever possible. We need to create an ecologically sustainable society which acknowledges that perpetual economic growth is not possible in a finite world. Our own work should have no negative impact on the environment or health. Where there is a possibility that a change in technology could lead to such damage action should be taken to control or prevent it, even when there may be uncertainty about the magnitude of the danger or its causality – i.e. the precautionary principle should prevail.

9.4 How the narrative challenges Practical Action

Although we can show that Practical Action's thematic focus, way of working and values largely conform to the ideas contained in this narrative, the narrative itself also throws up challenges for the organisation which it has yet to resolve completely. Five challenges in particular stand out – (1) what being part of a broader movement for change might mean in practice in terms of our relationships with organisation that argue for change in the developed world, (2) what the role is for an international non government organisation in such an approach, (3) how capable we are of knowing if our work has indeed improved wellbeing, (4) what the shift in global demographics from a rural to an urban society means for the narrative and, most significantly in terms of how we communicate our ideas to the rest of the world: (5) whether Schumacher's iconic concepts of 'small is beautiful' and 'intermediate technology' can still capture the essence of what Practical Action believes today, as outlined in this narrative. These are examined further below:

9.4.1 Our role as part of a wider movement for change

In section 9.1 above we suggested that Practical Action should see itself as a part of a wider movement for a global change to a system of economics and development focussed on sustainable wellbeing. Given that our remit is to work principally on the eradication of poverty in the developing world one question that arises is what being a part of a broader movement for change in both the developing and the developed world actually means in practice. Does it simply

mean we just need to recognise internally that what we work on has relevance in the developed world as well? Or does it mean we should try to find some way to work with other like minded organisations working on similar issues in the developed world to present a coherent picture of how change in poorer and richer nations is needed for a sustainable future? Should we have closer relationships, at least at a policy advocacy level, with other Schumacher Institutions such as the Soil Association, the New Economics Foundation and the Centre for Alternative Technology, for example?

9.4.2 Our role as an international Non Governmental Organisation

If a wellbeing centred approach to development recognises that the relational aspect of wellbeing is as important as the material aspect, then this must have implications for how Practical Action should position itself in relation to other organisations in the countries it works in.

Clearly, as an INGO, Practical Action has access to significant resources, influence and power compared to many local civil society organisations. When we are in partnership with such organisations it is important that we are aware of this and the potential distorting effect it can have on our relationship and on their wellbeing, in particular their ability to have a measure of control over their own destiny as institutions, make their own decisions, operate with dignity and have respectful relationships with other organisations and the communities they serve. We need to try as hard as possible to ensure that we follow the spirit of our narrative in such circumstances and remember to support and facilitate rather than dictate and act independently; to build the capacity of others rather than to try to implement direct actions ourselves.

However, although Practical Action is an international organisation, its staff are almost entirely nationals of the countries in which it operates, which often makes it feel closer to a local organisation on the ground and, as a result, more difficult for staff to see themselves as 'outsiders facilitating' rather than 'national capacity in action'. This confusion can be deepened further in some of the countries we work in where Practical Action is not necessarily a big fish even in the local context. In Peru, Bangladesh and India for example there are national NGOs that are significantly larger than the whole global Practical Action Group put together, and who wield significantly more influence and power locally that Practical Action can. Sometimes we partner them. Moreover, NGOs are not the only local organisations Practical Action partners. It is not uncommon for us to collaborate with government departments, banks, academic institutions, private sector companies and even utilities (such as the Nairobi water and sewerage corporation) where the imbalances of power between us and our partners are much less clear cut. In such circumstances is Practical Action still a builder of capacity, a facilitator and not a doer, an advisor rather than an agent of change?

These are challenging questions to answer. Some INGOs seek to sidestep these issues to an extent by converting themselves into federations of locally constituted organisations as opposed to networks of representative offices of an organisation domiciled in Europe or North America. This does increase local accountability as it usually involves a locally constituted board and being regulated as a national NGO rather than an INGO. It rarely removes the

imbalance of power that exists from having access to the resources and power of an international organisation however.

We have to recognise that there will be some occasions when we are more of a 'doer' than a 'facilitator' or 'capacity builder' – many of the consultancy contracts we carry out under our subsidiary company for example, are assignments to deliver an opinion or carry out a specific piece of work, not to build someone else's capacity to do that. But we also need to recognise that the majority of our relationships with local organisations will carry with them the responsibility for us to act as facilitators, catalysts and builders of capacity – to help others do rather than to do ourselves – if we are serious about wellbeing being the primary goal of development.

There is of course one area where there is absolutely no ambiguity. Our end goal is the wellbeing of poor women, men and children. In seeking to achieve that goal we have to make sure, whether we are in partnership with organisations who are more or less powerful than ourselves, whether it be through project work with direct beneficiaries or more distantly through policy advocacy, that we always work in a way that enables those poor women and men to have a higher degree of control and power over their own lives, be a part of decisions that have a major impact on the way they live, have the respect of their fellow citizens, and live in dignity and peace with their neighbours.

9.4.3 Our capability to understand how we are improving (or reducing!) wellbeing

A common challenge for all organisations involved in development is how to know what the intended and unintended, positive and negative impacts of any intervention are and who benefits and who looses as a result.

Our definition of technology justice:

> *(the right of people to decide, choose and use technologies that assist them in leading the kind of life they value without compromising the ability of others and future generations to do the same)*

clearly expects development to be a negotiated outcome between competing interests; if you promote the interests of one group (e.g. women), you can easily disadvantage others (e.g. children) or vice versa.

Like most NGOs (and other agencies) Practical Action tends to deal in averages – e.g. so many households gaining access to a water supply, so many farmers taking advantage of new techniques. It also tends to only measure the change it intended to happen, not all changes intended or otherwise. Thus in a project working with women dairy farmers we will tend to try to measure how many have increased their income as a result of applying new techniques, but not look to see if anyone's income has gone down. And we will assume the benefit is a net benefit to the household, without seeing if, for example, the diversion of women's time into entrepreneurial activity has had any negative consequences on their children's wellbeing.

There are many good reasons why this is so. Our projects are financed using grants which typically last for 2 to 3 years. During that period we can generally measure outcomes (numbers of people connected to water, numbers of farmers practicing a new technique). But the impacts of those outcomes on people's lives and their wellbeing generally take longer than a project cycle to fully emerge. To measure impact therefore requires the capacity to be able to go back to communities some time after projects are completed – something that is time consuming, requires additional staff, specialist skills (to look for unintended consequences) and additional funding which is often difficult to source.

That said, given our notion of technology justice assumes wellbeing is a negotiated outcome between competing interests, it is important that we do find ways to know more, not just about who benefits but also who looses out, both as an aid to improve our own practice and as further evidence (hopefully) that our alternative way of approaching development works.

9.4.4 Our take on urban vs rural

One area that has not been explored in detail in this document has been the changing demographics of the world. When Schumacher wrote Small is Beautiful in 1973 about 37% of the world's population lived in urban centres. That figure has now passed 50% and is expected to reach 59% by 2030. Over the coming 20 years, whilst rural populations are expected to remain roughly constant, urban populations will grow dramatically, with over 90% of that increase (1.3 billion) occurring in the developing world[101]. Whilst we believe that the underlying arguments of this narrative apply globally, and in urban settings as much as rural, we need to recognise that, at the moment, Practical Action still works more in rural than urban situations. Whilst we are not without experience of working on wellbeing in urban areas (and can articulate our approach to accessing basic services quite well in this respect) we will need to think more about how we talk about wellbeing in an urban context in areas where we have much less experience. Food security is one such area where we will need a clearer explanation of how our approach to smallholder farmers' livelihoods can be married with a need to affordable food supplies for the urban poor.

9.4.5 The Schumacher lexicon - is 'small still beautiful? Is 'Intermediate Technology' still best?

Small is Beautiful provides us with a lexicon or dictionary of phrases that captured the essence of the ideas Schumacher was trying to convey at the time. Of those phrases 'small is beautiful' and 'intermediate technology' are probably the best known. The question for Practical Action is whether these phrases have stood the test of time and still work as iconic concepts that convey the heart of our ideas or whether they have become, over time, too laden with alternative meanings to be useful.

The issue of scale was a central theme to the book *Small is Beautiful*. In this document, our focus on the conditions that are necessary to ensure that poor communities have a voice in decisions that impact on their lives has lead to the

statement of a principle of subsidiarity (p58). If people's power and control over their lives is a critical part of a sense of wellbeing, and if relationships between people and between people and the institutions that affect their lives is important, then keeping decision making processes as close to those affected by them as possible makes sense.

Schumacher argued in *Small is Beautiful* that we need to rethink our ideas of economies of scale. He wasn't arguing that everything had to be small, rather that we shouldn't conversely try to push everything to scale. He seems almost exasperated at times in *Small is Beautiful* about this:

"What I wish to emphasise is the duality of the human requirement when it comes to the question of size: there is no single answer. For his different purposes man needs many different structures, both small ones and large ones, some exclusive and some comprehensive……"[102]

We do need to organise ourselves in some ways at a global level: dealing with conflict, poverty, environmental degradation and sustainable and fair use of natural resources all require us to organise on a scale that crosses national boundaries. But we do need to rethink the idea of scale in relation to economics as the trend to organise our economies around ever grander scale structures has tended to increase rather than decrease the gap between the rich and the poor and has lead to pursuit of an economic model which is clearly unsustainable.

Across the world we need to find a new balance between what is global and what is local. In the developing world, small scale decentralised energy production will remain the only way many poor people in remote areas will get access to electricity in the foreseeable future. The creation of small and medium sized enterprises and the boosting of local production for local consumption will be the main way in which meaningful employment will be created and the drift of populations from rural to urban centres and the creation of even more 'ghetto' working conditions in employment sectors such as the garment industry avoided. And a re-emphasis on small scale mixed agricultural production for local consumption will remain vital, not just for creating employment, but also for maintaining the genetic diversity we will need to fight climate change, avoid a future meltdown of our food supplies through disease or pest attack, and tackle some of the major human health issues caused by the emerging global diet.

The challenge is for us to be able to grasp the complexity of the task that faces us and avoid reaching for a simple single solution for everything where none actually exists. There is a danger that our narrative may look in some ways as something of an eclectic set of approaches; but it's what is required for the job ahead. We need to think both small and big, depending on the job at hand. Schumacher's response to this dilemma was to focus on the fact that 'smallness' was the underdog:

Today, we suffer from an almost universal idolatry of giantism. It is therefore necessary to insist on the virtues of smallness – where this applies. (If there were a prevailing idolatry of smallness, irrespective of subject or purpose, one would have to try and exercise influence in the opposite direction)[103]*…….*

We know that although size isn't everything, it remains necessary to point out that, in many cases, small <u>is</u> still beautiful. The question for us is how much

does the phrase 'Small is Beautiful' work for us as a central theme, a concept which galvanises and enthuses people? We know that most of our work centres on putting poor people in control and requires structures of organisation that are small and local. But we also know that, to work, these community structures often have to be able to interact with much larger structures and systems – municipal authorities or markets for example. So 'small is beautiful' only tells part of the story. The question is does it tell enough of it to still be a central theme for Practical Action?

In order to establish 'right livelihoods' Schumacher believed that technologies were needed that were human in scale and which could be owned, understood and managed by those who used them. He also argued that a theory of economics that put the creation of employment at its heart had to consider the cost of establishing each new workplace as more important than a crude calculation of the productivity of each worker. To this end he came up with the concept of 'intermediate technology':

"The technology of mass production is inherently violent, ecologically damaging, self-defeating in terms of non-renewable resources and stultifying for the human person. The technology of production by the masses, making use of the best of modern knowledge and experience, is conducive to decentralisation, compatible with the laws of ecology, gentle in its use of scarce resources, and designed to serve the human person instead of making him the servant of machines. I have named it intermediate technology to signify that it is vastly superior to the primitive technology of bygone ages but at the same time much simpler, cheaper, and freer than the super-technology, or democratic or people's technology – technology to which everybody can gain admittance and which is not reserved to those already rich and powerful…."[104]

Again this is a clear and simple concept to understand. And the majority of Practical Action's project work would involve technologies which could be described as 'intermediate' in the sense Schumacher meant. But not all. We are increasingly interested in and engaged on the role new, more complex science based technologies can play – mobile phones for early warning systems, solar panels for household electricity, mp3 players as a vehicle for agricultural extension advice, modern veterinary drugs to help pastoralists survive, knowledge objects as a way of non literate people being able to access information from computers, and the possibility that nano technology might be useful for removing bacteria and inorganic contamination from village water supplies, being a few examples. And as we work more in urban areas we are more likely to find that our work is less about introducing small scale simple technologies but helping negotiate access rights for the poor to large scale, modern and increasingly complex technologies – helping urban slum dwellers get access to mains electricity or mains water being two such examples. None of these fits Schumacher's description of 'intermediate technology' quoted above. Again, although much of what we do uses 'intermediate technology' does the phrase adequately capture our philosophy and approach today?

'Small is beautiful' and 'intermediate technology' convey clear and simple messages which are easy to remember, which differentiate Practical Action from other organisations, and which recognise our heritage from Schumacher. The question is whether they are sufficiently accurate to convey our current day interpretation of Schumacher's ideas? Both phrases are subject to potential misunderstanding and misrepresentation and could cause us problems were we

to use them as a core part of the expression of our brand for example. Both can leave us open to (unwarranted) charges of naivety (don't we understand that some issues, such as climate change, can only be tackled at scale? don't we realise that we are already using and advocating some technologies in our own project work which are clearly not 'intermediate'?). And both are sometimes interpreted as meaning that we are promoting a different and somehow 'second best' or inferior solution for the developing world.

The idea we were promoting second best for the developing world could perhaps be dealt with if we were to make more of the fact that we felt these ideas applied equally to the developed world as well. But this would then require us to explain more our views on what a sustainable future for what is currently termed the developed world might look like.

The problem of appearing naive is more difficult to resolve. Our focus on relational well being could allow us to continue to use 'small is beautiful' to emphasise the need for structures and institutions that allow poor people's voices to be influential in a world dominated by globalisation. But the term 'intermediate technology' probably needs to be replaced with the ideas behind the principle of 'technology justice' – that technology is ideological and that it's not just the type of technology that is used that is important, but who controls it, how well it meets poor people's needs, and how it impacts on other people's chances to live the life they value, either today or in the future.

10 Taking practical action – our challenge to demonstrate the narrative in practice

This document started with a discussion of how well Schumacher's views on economics, technology, development and the environment have stood the test of time. Over the past 40 years language has changed and the style of Small is Beautiful as well as some of the analysis looks a bit dated. But the core of the arguments laid out there are as valid today as they were then: that our insatiable appetite for an ever-expanding consumer lifestyle is unsustainable; that we have to find an alternative to growth-based economics which takes account of happiness; that technology needs to have a 'human face'; that human relations are critical to happiness and that we should aim to create (right) livelihoods that strengthen a person's ties to the society they work in, not alienate them from it. It is a short journey from the idea of economics as if people matter[vii] to the idea of wellbeing as the principle driver of development.

Practical Action's way of working today conforms to the idea that sustainable well-being should be the principle goal of development. We focus our efforts on some of the main material components of wellbeing and the way we and our partners work is in tune with the relational aspects of wellbeing. Our underlying principle of technology justice means that we also work not just to create wellbeing today, but to assure that it is sustained into the future. We still have some challenges ahead to fully conform to our narrative vision, but we are well on the way to doing so.

Today there is more interest than ever in the core ideas behind our narrative and instances abound of crossover between our analysis of what is required for sustainable wellbeing and current major policy debates and discussions. For example wellbeing itself is now the subject of government commissions and academic courses; climate change forces heads of governments to meet to discuss sustainable development and our common future; the energy crisis is forcing attention onto the possibilities of a green low carbon development paths; and the conclusions of a major intergovernmental study on the future of agriculture align with our belief in the need to support small scale agro ecological farming[viii].

We should be happy that our time has come, that finally the tide is turning in our favour in the struggle to get our ideas heard. But the fact is that nearly 40 years on from Small is Beautiful these ideas are still not making it across the barrier from academic discussion into practice at any scale. It is impossible to underestimate the inertia to change that exists: the commercial and political disincentives to do things differently, the sheer dead weight of our combined vested interests in the status quo, the sheer lack of power and voice of those whose needs are most immediate.

[vii] The subtitle of Small is Beautiful

[viii] The International Assessment of Agricultural Knowledge, Science & Technology for Development, April 2008

For that reason there is more urgency now than ever for organisations like Practical Action to make that transition from theory to practice, to trail blaze and to show how things could be different on the ground, to show how ideas of technology justice and wellbeing can lead to a different more equal global society with a real chance of a sustainable future. As the 100th anniversary of the birth of Fritz Schumacher draws near, it is time for us and other Schumacher inspired organisations to take up the mantle of Small is Beautiful and update and marshal those arguments anew for the 21st century.

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