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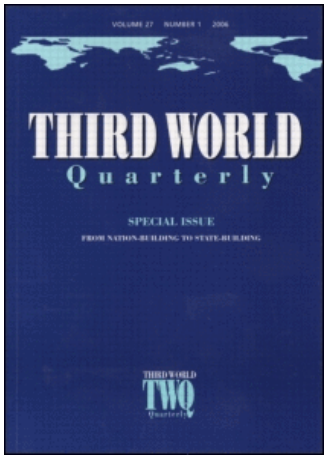

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Misguided Investments in Meeting Millennium Development Goals: a reconsideration using ends-based targets

JEFFREY JAMES

ABSTRACT *This paper contends that some of the Millennium Development Goals do not distinguish between potential and actual achievements. In the case of education for instance, the completion of primary education by all students is not an end in itself, but rather an intermediary phase in the process of learning to read and write, and so on. Thus, meeting the stated Millennium Development Goal may in fact do little or nothing to enhance these more ultimate achievements. Using other, similar examples, we suggest that governments need to consider moving from means- to ends-based proxies, and in so doing, to reconsider whether the way that resources are allocated in any given sector is in fact the optimal one.*

Perhaps because they seem to be so self-evidently desirable, the Millennium Development Goals (MDGs) have largely escaped conceptual scrutiny of any kind. Our intention in this article, is not to challenge the need for, or the importance of, any of the goals agreed by all 191 member states of the United Nations. The aim, rather, is to show that, when one looks at the MDGs from the perspective of a particular analytical framework, an important distinction between them emerges and needs to be confronted. In particular, using Sen's (1985) concept of functionings, one can differentiate between MDGs that, on the one hand, represent actual achievements and those that, on the other hand, are merely contingent, depending on the effectiveness of converting potential into *actual* achievements. Using both micro and macro data, we shall suggest, furthermore, that the process of conversion is often highly ineffective and as such mitigates against the chance of turning goals stated in terms of *means* into *ends*, as measured in the latter case, by functionings in the specific area under consideration. Accordingly, we proceed to look at the possibility in these cases of moving from means- to ends-based measures of the MDGs. Before examining the MDGs from this point of view, however, we begin with a brief description of the concept that underlies it.

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Functionings

In his *Commodities and Capabilities* (1985), Sen takes the view that what matters to individual or societal well-being is not the ownership or presence of goods and services but, rather, what is actually *done* with the characteristics embodied in those goods and services. What matters, according to Sen is 'what the person succeeds in *doing* with the commodities and characteristics at his or her command' (p 10, emphasis added). For example:

> if a person has a parasitic disease that makes the absorption of nutrients difficult, then that person may suffer from undernourishment even though he may consume the same amount of food as another person for whom that food is more than adequate. In judging the well-being of the person, it would be premature to limit the analysis to the characteristics of goods possessed.

Or again:

> A bicycle is treated as having the characteristic of 'transportation', and this is the case whether or not the particular person happening to posses the bike is able-bodied or crippled. In getting an idea of the well-being of the person, we clearly have to move on to '*functionings*', to wit, what the person succeeds in *doing* with the commodities and characteristics at his or her command. For example, we must take note that a disabled person may not be able to do many things an able bodied individual can, with the same bundles of commodities. (p 10, emphasis added)

Although Sen's idea is entirely general, it applies, we feel, with particular force to developing rather than developed countries. For, to a large degree, the functionings induced by goods and services depend on a wide array of complementary resources, which are more likely to be available in developed countries, for whose circumstances the vast majority of goods and services are designed over time.[1] Infant formula is a good example in this respect for, while the necessary complementary inputs (such as clean water and refrigerators) were widely available in rich countries, this was not the case among the majority of users in the developing world. Thus it was that the same product had a largely favourable effect on infant functionings in the one setting, and an often highly negative effect in the other (as manifest, for instance, in severe infant diarrhoea and subsequent bacterial infections).

In what follows, however, our concern is not with the differential degree to which functionings are induced in rich versus poor countries. It is rather with the issue of whether the MDGs can be regarded as functionings (in the sense that Sen uses the concept), or as some intermediate phase in the process by which these ultimate achievements are reached.[2]

Functionings and the Millenium Development Goals

Table 1 sets out the goals and targets of the Millenium Project, which, generally speaking, are specified in precise numerical terms. The main

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TABLE 1. Millennium Project

Goals and targets

Goal 1: Eradicate extreme poverty and hunger

- Target 1. Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day
- Target 2. Halve, between 1990 and 2015, the proportion of people who suffer from hunger

Goal 2: Achieve universal primary education

- Target 3. Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling

Goal 3: Promote gender equality and empower women

- Target 4. Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015

Goal 4: Reduce child mortality

- Target 5. Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate

Goal 5: Improve maternal health

- Target 6. Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio

Goal 6: Combat HIV/AIDS, malaria, and other diseases

- Target 7. Have halted by 2015 and begun to reverse the spread of HIV/AIDS
- Target 8. Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases

Goal 7: Ensure environmental sustainability

- Target 9. Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources
- Target 10. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation
- Target 11. Have achieved by 2020 a significant improvement in the lives of at least 100 million slum dwellers

Goal 8: Develop a global partnership for development

- Target 12. Develop further an open, rule-based, predictable, non-discriminatory trading and financial system (includes a commitment to good governance, development, and poverty reduction both nationally and internationally)
- Target 13. Address the special needs of the Least Developed Countries (includes tariff- and quota-free access for Least Developed Countries' exports, enhanced programme of debt relief for heavily indebted poor countries (HIPCs) and cancellation of official bilateral debt, and more generous official development assistance for countries committed to poverty reduction)
- Target 14. Address the special needs of landlocked developing countries and small island developing states (through the Program of Action for the Sustainable Development of Small Island Developing States and 22nd General Assembly provisions)
- Target 15. Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term
- Target 16. In co-operation with developing countries, develop and implement strategies for decent and productive work for youth
- Target 17. In co-operation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- Target 18. In co-operation with the private sector, make available the benefits of new technologies, especially information and communications technologies

Source: Millennium Development Project (2005).

exceptions to this form of specification are the targets associated with the eighth and final goal, which, as shown, are mostly just appeals to direct policy, towards, for example, the landlocked and least-developed countries,

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or towards very large problems such as debt sustainability. (Much the same is true of Target 9, which is about macro policy for sustainable development.) The link between these mostly macro-policy goals and the individual functionings with which we are concerned is clearly remote, although, as argued below, two of the targets do bear a much closer relationship to the functionings aspects of the MDGs. It is on these that we shall focus our discussion under the eighth and final goal.

MDGs as functionings

Let us first consider those of the MDGs that can unambiguously be described as improved functionings in the sense defined above (as relating, that is, to an 'achievement of a person', as opposed to the mere potential for achievement). This category, it seems to us, mostly concerns the health-related goals 4, 5 and 6, referring, respectively, to reducing child mortality, improving maternal health and combating/reversing major diseases afflicting poor countries. In terms of functionings, the first two goals can be described as extending the lives of two specific, and especially vulnerable members of society (small children and mothers), while the third goal is about being free from major disease for the society at large.

The second target associated with Goal 1—to halve the proportion of people suffering from hunger—also clearly falls into this first category. After all, there are few things more fundamental to a person's well-being than whether or not he or she is free from hunger. The first target associated with the same goal, by contrast, has to do with income, which *per se* cannot be described in terms of functionings, because it is only an input into the entire process by which goods and services are converted into the achievements of a person. As Sen himself puts it:

> Well-being is indeed sometimes seen as reflected by the commodity-command of a person (how 'rich' he or she is), and this is one of the motivations for 'real income comparison' in terms of market command over goods and services. As an approach to interest this is, ultimately, a confusion of 'well-being' with 'being well off', and a confounding of the *state* of a person with the extent of his or her *possessions*. (Sen, 1985: 23)

Less obviously subject to this line of criticism, however, are numerous other MDGs, to which we now turn, *seriatim*.

MDGs as means rather than ends (functionings)

Goal 2 strives to ensure that all children 'will be able to *complete* a full course of primary schooling' (emphasis added). I have emphasised the word 'complete' because it rightly draws attention to the often large divergence, especially in rural areas, between the numbers enrolled in primary school at any point in time and those who actually complete the full cycle. Ultimately, however, the goal is not merely to raise the numbers of children who complete the full cycle of primary education. It is rather to improve the basic

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functionings, or achievements, of children, by *means* of such education. And, especially as a result of research carried out in recent years, it has become all too clear that there are considerable differences in basic functionings among children who have completed the same amount of primary (and secondary) education.

Most of the evidence in question emanates from the UNESCO–UNICEF Monitoring Learning Achievement (MLA) Project, which began in the early 1990s and covers both developed and developing countries. From our point of view, perhaps the most compelling evidence is that which shows differences in learning achievements for pupils in the *same* grade (4), among selected countries in the *same* region, such as, for example, sub-Saharan Africa. Table 2 shows differences in learning achievements in three major areas, literacy, numeracy and life skills, for grade 4 pupils, in nine countries in that region. (Each dimension, in turn, is sub-divided into more specific functionings and thus provides evidence on an unusually detailed range of learning achievements at the same grade level.)

Recall, from our earlier discussion, that, by citing the completion of primary education as a goal in itself, the Millennium Project implicitly assumes a close relationship between years of schooling and educational achievements (although, of course, some students may take longer to complete a primary school education than others). The entries in the columns of Table 2 allow us to examine the validity of this assumption and in general they provide little or no support for it. Indeed, in some columns, the highest country score exceeds the lowest by a factor of two (eg the columns headed 'writing' and 'number'). It is far from true, moreover, that such large discrepancies between countries are merely the result of differences in per capita incomes. In the case of the writing component of literacy, for example, one of the richest countries in Africa, Botswana, has a score that is strikingly lower than that of Mali, one of the poorest. Similarly, another of the poorest countries in sub-Saharan Africa, Niger, has a higher score on the 'vocabulary' component of literacy than a number of far richer countries.

The general conclusion that emerges from Table 2, however, is that achievement of primary education for all by 2015 is entirely consistent with sizeable variations in *actual* learning achievements. A more appropriate goal for primary education in the Millennium Development Project, therefore, would be the universal attainment of certain minimum levels of mastery in literacy, numeracy and life skills.[3] This shift in goals would require a concomitant shift in research, away from the factors that determine the completion of primary education, to the variables that mediate between such an education and minimum learning achievements (as defined by the MLA project).[4] As aptly expressed by Chinapah (2003: 17), for example, more attention should be given to curriculum planning, teacher education and training, and text book development to identify selected areas for intervention. Teaching and learning outcomes are not only influenced by the specificity of a particular country, its teachers and learners, but equally by the specific characteristics of each and every learning domain and area.

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TABLE 2. Learning achievement profiles of selected MLA African countries by learning domains for Grade 4 pupils (% mean scores)

	Literacy				*Numeracy*			*Life Skills*		
	Vocabulary	*Comprehension*	*Grammar*	*Writing*	*Number*	*Measurement*	*Geometry*	*Health*	*Civic & Environment*	*Science & Technology*
Botswana	70.0	53.0	49.0	27.0	53.0	39.0	54.0	54.0	69.0	49.0
Madagascar	53.0	72.0	48.0	56.0	49.0	32.0	43.0	80.0	72.0	76.0
Malawi	54.0	37.0	35.0	23.0	42.0	43.0	47.0	78.0	80.0	70.0
Mali	85.0	57.0	43.5	45.3	34.1	49.9	48.3	56.2	58.1	55.6
Mauritius	89.0	68.0	60.0	47.8	61.5	52.1	61.7	67.2	67.2	56.7
Niger	80.6	50.5	43.2	32.7	35.9	42.6	45.8	46.2	48.7	48.5
Senegal	75.2	48.4	48.7	36.1	28.9	39.4	38.4	47.6	48.4	40.6
Uganda	80.0	62.0	59.0	47.0	48.7	47.6	52.6	68.4	66.3	64.0
Zambia	72.0	45.0	49.0	28.0	36.0	35.0	37.0	52.0	52.0	48.0

Source: Chinapah *et al* (2000: 20)

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In terms of resource allocation to education, a possible implication of the above findings may be that it is preferable to achieve some combination of quality and quantity of primary education, rather than simply the latter alone.[5]

Promotion of gender equality and empowerment of women

Target 4 is to 'Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015' (see Table 1 above). Unlike the previous goal, which was stated essentially in quantitative terms, Target 4 leaves open the question of whether gender disparity should be measured in terms of 'inputs' (such as the completion of primary education), or 'functionings' (measured, as before, by learning achievements). If, of course, the former measure gives similar results to the latter—if, that is to say, 'inputs' serve as a good proxy for 'outputs'—then either can be used to measure progress towards Target 4. In reality, however, as the functionings approach would tend to predict, the two measures give different results since so many variables condition the relationships between the two. In particular, the evidence suggests that, even at the same grade level in a given country, gender inequality exists, although the direction of the bias differs according to which grade is chosen.

In particular, the evidence strongly indicates a bias in favour of girls at the fourth grade level but, by the time students reach grade 8, the direction of the bias is totally reversed (as measured, at each grade, by educational achievements of one kind or another). In relation to the lower of the two grades, one of the most reliable sources of evidence is the detailed survey of developed, transition and developing countries, conducted as part of the Progress in International Reading Literacy Study 2001 (PIRLS, 2001). Although the number of developing countries is small in relation to the sample as a whole, in each such country the reading achievement of girls is higher than for boys and, in two cases—Iran and Belize—the difference in achievement is especially pronounced by the standards of the sample as a whole.

The shift towards gender bias in favour of boys, rather than girls, in grade 8 has been documented, among other studies, by the MLA II project. As opposed to its predecessor, referred to above in connection with differences in literacy, numeracy and life skills at the grade 4 Level, MLA II focuses on achievements in mathematics, physics and chemistry, with a heavy regional focus on Africa. Table 3 contains the results of this later survey for a sample of six African countries, including three that also appeared in Table 2.

These results have:

> [been said] to illustrate the serious challenges for achieving gender parity at secondary education level in Africa . . . It can be noted that with the exception of Niger where girls generally do better, the most statistically significant

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TABLE 3. Monitoring Learning Achievement (MLA II)—Grade 8 survey results 2002–03 (% mean scores by gender and discipline from six African countries)

	Mathematics			*Physics*			*Chemistry*			*Other sciences*		
Country	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*
Burkina Faso	32.5	31.0	31.9	42.6	36.6	40.2*	42.8	40.6	41.9	58.3	55.1	57.0*
Cameroon	30.9	27.5	29.2*	41.8	36.2	39.1*	46.1	43.4	44.8*	56.4	53.2	54.9*
Mali	25.2	23.6	24.5*	35.3	32.5	34.1*	33.5	31.2	32.5*	39.0	37.1	38.2*
Mauritania	36.4	32.0	34.2*	28.8	25.9	27.4*	33.9	31.5	32.7*	46.3	45.1	45.7
Niger	28.0	26.4	27.3	32.3	34.4	33.1*	34.8	36.1	35.4	45.8	45.9	45.8
Senegal	38.6	33.9	36.3*	38.7	34.9	36.8*	40.4	38.0	39.2	52.0	49.2	50.6*

Note: *Statistically significant.
Source: UNESCO–UNICEF (2003).

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> differences observed are those in favor of boys' performances. These gender differences are clear proxies for the broad and untapped areas of inequalities in African educational systems (Chinapah, 2003, p. 17).

The exclusive focus on mathematics and science subjects in the MLA II programme was, one should note, primarily a response to the growing demands made by UNESCO member states (especially those located in Africa, Asia, the Middle East, Latin America and Central Asia).[6] What they were interested in, more specifically, were the mathematics and science achievements of students in the eighth grade. It thus remains an entirely open question whether girls at this level might have done better than boys in other subjects (such as literature or languages). But, even if this *was* the case, one might still be tempted to conclude that girls, on balance, remain disadvantaged because mathematics and science subjects matter more in getting a well-paid job.[7]

Ensuring environmental sustainability

Under this goal we shall focus on Target 10, which, as cited in Table 1, is to 'halve by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation'. Although it may at first seem like an end in itself, the provision of water and sanitation does not, in itself, ensure that the desired functionings (such as improved health or higher educational scores) actually occur. After examining some of the variables that mediate this contingent relationship, by means of a number of micro cases in the area of water and sanitation, we then present evidence to show that the problem applies to infrastructure more generally and may indeed have an unexpectedly sizeable impact at the macro level of developing countries. At both levels, the essential point is that the impact of infrastructure on various forms of functioning is highly conditional, depending as it does, on a range of engineering, economic and social variables.

At the micro level some such variables have been well described by the World Bank in relation to health functionings, as follows:

> Experience shows that *constructing water supply and sanitation facilities is not enough to improve health; sanitation and hygiene promotion must accompany the infrastructure investments* to realize their full potential as a public health intervention. Changing hygiene behaviour is complex. Hygiene promotion is most successful when it targets a few behaviours with the most potential for impact. Based on extensive research, WHO and UNICEF have identified hand washing with soap (or ash or other aid) after stool disposal and before preparing food; safe disposal of faeces and use of latrines; and safe weaning food preparation, water handling and storage as the key hygiene behaviors. A recent review . . . of all the available evidence suggests that hand washing with soap could reduce diarrhoea incidence by 47% and save at least one million lives per year. (World Bank, 2003, emphasis in original)

Indeed, some students of the topic go so far as to suggest that, without these and other complementary changes, few, if any, benefits will be realized

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merely by installing the hardware of water supply and sanitation. It may be the case, for instance, that 'people choose not to use the facilities built for them' (IRC, nd) or, even if used, they may yield only slight benefits, because a lack of knowledge or a lack of capabilities prevents them from being used in anything like the intended manner (as could easily occur if sanitation techniques from donor countries were employed among poor, uneducated inhabitants of the developing countries). In other cases it is poor planning which, by overlooking the need for complementary inputs, may result in a negative net outcome. 'For example provision of a water supply without allowing for the removal of wastewater may create standing water, thereby producing health hazards and poor living conditions which may outweigh its positive benefits. Nor is sufficient attention paid to the fact that the reduction of waste and the more efficient use and reuse of water and materials is the most effective way to reduce demand for waste treatment and disposal' (Kalbermatten *et al*, 1980: 24).

It would, of course, make our case more compelling if the aggregate or macro effects of anecdotes such as these were known to be substantial (if only very roughly). Unfortunately no such data for water supply and sanitation are available. What are available, however, are attempts to estimate the aggregate effects of ineffective usage, in the case of other forms of infrastructure. Most notably, Hulten (1994) has carried out a cross-country analysis of five forms of infrastructure, namely, paved roads, telephone mainlines, electricity generating capacity, irrigation and railways. Using effectiveness indicators such as 'mainline faults per 100 telephone calls' or 'the percentage of paved roads in good condition', he comes to the remarkable overall conclusion that a 1% increase in the effectiveness with which infrastructure is used has an impact on growth that is seven times greater than the same increase in the rate of public investment. Looking at the same results from the contrasting perspectives of East Asia and Africa, the conclusion is no less dramatic. In particular, 'had the African countries in the sample operated their infrastructure stocks with the same effectiveness as the four Asian economies, their average growth rate would have been 0.75 per year rather than -0.20' (Hulten, 1994: 23). This result, we should emphasise, is not just important in its own right, but also because it sends so powerful a message to policy makers concerned with meeting the MDGs in areas like Africa that less attention should be paid to the mere provision of infrastructural investments and much more to what they actually achieve. Such a shift in focus would help poor countries to capture some of the benefits that are currently being lost in the effective use of infrastructural facilities. Put another way, in a form that is especially relevant to the MDGs, the World Bank observed in 1994 that:

> Passing up such gains translates directly into human costs because it means limiting progress in reaching the 1 billion people who still lack *safe drinking water* and the nearly 2 billion people who lack access to electricity and *adequate sanitation facilities*. At current [1994] costs of roughly $150 per person for water systems, the redirection over three years of just the annual quantifiable

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> technical losses of $55 billion would mean that the 1 billion people without safe drinking water could be served. (World Bank, 1994: 122, emphasis added)

Aid donors, in particular, would do well to heed this general message about the ineffectiveness of infrastructural use, since so many of their project failures in the past can be attributed to the poor functioning of imported technologies in local conditions.[8] It is a message, moreover, that is only strengthened when one examines Targets 17 and 18 of the final MDG, as we shall now seek to demonstrate. (In fact, if Target 18, relating to information and communications technology (ICT), is regarded as a form of infrastructure, then there is a direct link to the discussion in this section.)

Developing a global partnership for development

As noted above, most of the targets under this heading have only the remotest connection with the functionings of poor individuals. Targets 17 and 18, however, are about bringing the benefits of modern technology to developing countries by broadening in one way or another the access to, or use of, such technology (essential medicinal drugs, in regard to the former target and information and telecommunications technologies in the case of the latter).[9] The Targets, that is to say, are about giving individuals and households something they did not previously possess, namely, the ability to use products and technologies which have the potential to deliver major welfare benefits in a variety of different forms. The problem, yet again however, is precisely that these benefits are only potential, and may in practice be scarcely realized or not realized at all.

In the case, first, of medicinal drugs, it can be argued that the variables conditioning the relationship between potential and actual outcomes exert their influence in a sequential fashion.[10] For instance, if a drug is to be effective in curing an illness, it is necessary, first, that a correct diagnosis be made and, second, that the appropriate drug be chosen and used as instructed. Even if all these conditions are met, moreover, there is some chance that the overall outcome will not be positive (if say, the individual is allergic to the drug, diseased in other ways, or genetically non-responsive to the particular way in which a group of medications works). Indeed, it is useful to portray the sequentiality of the process in the form of a 'tree' diagram, 'each of whose forks represent the outcome of a particular stage in the process by which drug consumption is converted into health functionings' (James, 2000: 77). Figure 1 captures this idea for each of the phases mentioned above (with the final phase representing the idiosyncratic effect of a given drug on individual patients).

From basic probability theory we know that the likelihood of eliciting the desired functioning (freedom from illness) is a multiplicative function of the four individual probabilities, p1, p2, p3 and p4. In the circumstances confronting the majority of those living in developing countries—especially in rural areas—it is all too likely that each of the probabilities will tend to be low for many, if not most, medicinal drugs. Consider, for example, the fact

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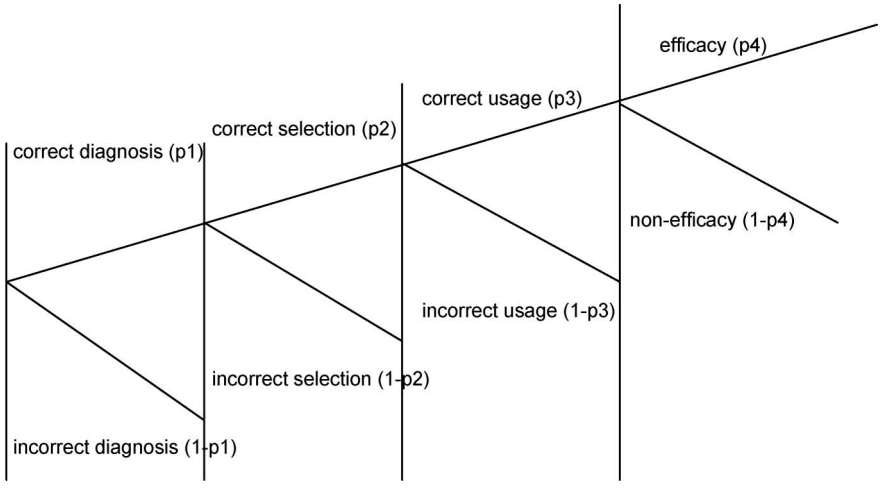

FIGURE 1. Sequentiality in the determinants of health functionings.
Source: James (2000).

that modern drug use in those areas is often unprescribed and unsupervised by qualified medical practitioners; that rates of compliance with modern drugs such as antibiotics can be as low as 11%; and that the efficacy may often be negatively influenced by poverty-related factors, such as malnutrition (as is the case, for example, with vaccines given to those suffering from protein-energy malnutrition). In general, because they are properly administered and well tolerated, vaccines tend to be the most efficacious of modern medicines in poor areas of developing countries (the vaccine for measles is thought, for example, to have an efficacy of around 85%).

Information technology

It may seem difficult to include costly information technology, which is often used for production, with far less expensive medicinal drugs that are only used for consumption. In fact, however, making the former more widely available to the majority of those living in developing countries (and again, especially in rural areas), runs, from a welfare point of view, into the same basic types of problem as have just been described in relation to modern medicinal drugs. These problems emerge most clearly from the widespread attempts by foreign-aid donors to establish so-called 'Telecentres', which serve, predominantly in rural areas, as communal access points to a range of information technologies, including the internet. Indeed, 'Telecentres have been hailed as the solution to development problems around the world because of their ability to provide desperately needed *access to* information and communications technologies (ICTs)' (Oestmann & Dymond, 2001: 1, emphasis added).

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According to the bulk of the evidence, however, rural inhabitants do not exhibit much interest in using the internet, even when it is freely available. Among those that do, problems of language and relevance militate against an improvement of any functionings.[11] Most telling perhaps is the survey carried out by the International Development Research Centre in sub-Saharan Africa, where some 3500 respondents from five countries were sampled during 2000 and 2001 (Etta & Wahamiu, 2003). Table 4, for the Mozambique case, specifies the low percentage of internet users, a figure that well represents the findings of the sample as a whole. Among those who made no use of this technology, moreover, were overwhelmingly the groups that are supposed to benefit from the MDGs, such as females, the uneducated and the illiterate, and those drawn from members of society with a low socio-economic status. The essential point here is not that ICT can *never* benefit these groups. It is rather that making this technology available is not in itself a good way of going about it. More relevant for policy would seem to be indirect ways of enabling the poor to access the benefits of the internet, such as rural kiosks in India where, for a small fee, an intermediary sells various services such as e-mail, or communal use of mobile phones, where the required capabilities are negligible (James, 2004). (Use of the internet, as with other forms of infrastructure discussed above, will in most parts of developing countries be highly ineffective.)

From means- to ends-based measures of the MDGs

Grounding our argument in Sen's notion of functionings, we have suggested above that some of the MDGs are in fact means rather than ends and that the

TABLE 4. Frequency of use of telecentre services (Mozambique)

Telecentre services		*Frequency of use*											
		5 D/W		*3–4D/W*		*1–2D/W*		*2D/M*		*1D/M*		*Total*	
Manhiça		M	F	M	F	M	F	M	F	M	F	M	F
	Email	4	0	0	0	9	0	2	0	2	0	17	0
	Internet	4	0	0	0	3	1	3	0	0	1	10	2
	Use of Computer	13	7	11	2	8	0	3	0	4	0	39	9
	Telephone	6	3	9	2	10	2	2	1	1	1	28	9
	Fax	1	0	1	1	0	1	1	1	0	0	3	3
	Photocopies	6	1	11	0	6	1	5	2	7	2	35	6
Namaacha	Email	3	1	2	0	2	2	1	0	1	1	9	4
	Internet	1	0	0	2	1	1	1	0	1	1	4	4
	Use of Computer	9	2	1	2	5	5	1	0	1	0	17	9
	Telephone	12	10	16	8	11	9	3	0	0	1	42	28
	Fax	2	1	0	0	1	2	0	0	0	0	3	3
	Photocopies	12	4	3	6	27	4	4	5	2	9	58	38

Notes: D = day, W = week, *M* = month, M = male, F = female, D/W = days per week, D/M = days per month.
Source: Etta & Wahamiu (2003).

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effect of the former on the latter can be highly variable. As such, therefore, the one measure may be a poor proxy for the other and it is ends, not means, in which we are ultimately interested. On the other hand, it could be, and frequently is, argued, that means-based measures represent, in practical terms, the only real option, since cross-country data on ends are simply not available, or available at very high cost.

It is certainly true, for example, that there are currently no measures of the differential degree of effectiveness with which infrastructure (including information technology) is used in a large sample of developing countries (although, given the vast losses that ineffective use seems to engender, the search for such measures would seem to yield clear net benefits). With regard to primary education, by contrast, it would be relatively easy to supplement the measure of the sheer numbers who actually achieve this level with proxies for what such students actually attain in terms of literacy, numeracy and so on (eg by using country data on variables that are widely known to promote such achievements).[12] Similar reasoning can be applied to the measurement of gender parity in primary school, by using proxies for gender achievements, rather than simply the ratio of males to females. Again, the numbers of computers and internet connections that are currently used are an inadequate measure of the benefits derived from information technology by developing countries; they could profitably be replaced (or supplemented) by numbers of mobile phones (whose users are far more likely to be of benefit, given, as noted above, the low requirement of any user capabilities).

Conclusions

Using Sen's concept of functionings as an analytical framework, this paper contends that some of the Millennium Development Goals fail to distinguish between potential and actual achievements (or, which amounts to much the same thing, between means and ends). This failure is important, we feel, because meeting some of the stated 'goals' may in fact do little or nothing to enhance actual functionings. This recognition ought to prompt governments to consider whether the way that resources are allocated in any given sector is in fact the optimal one.

In the case of the education goal, for instance, universal completion of primary school is *not* an end in itself, but rather an intermediate variable in the process of learning to read, write, and so on. And the evidence shows all too clearly how students with the same amount of schooling can have dramatically large differences in their learning achievements, within and between countries. Indeed, for each of the other MDGs that were considered from this critical point of view, the available evidence tends to show a no less striking variation between the 'goals' and their ultimate impacts on human functionings (such as gender equality or freedom from illness).

From a practical point of view, however, one needs to recognise that these cases are dependent on the existence of measurable functionings (or ends-based targets) across only a limited number of countries. If the case in favour of ends-based measures is to be generalised, indicators need to be found for a

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wide range of different countries. Otherwise, it can be argued that the means-based measures are the best one can do under the circumstances. What we have found is that, although this argument applies with varying degrees of force to some of our cases, it does not apply to others, for which ends-based proxies can already be used across a wide range of different countries.

Notes

1 It is still the case that the overwhelming majority of global R&D is undertaken in and for developed, rather than developing countries.
2 Notice that there is no ready way of determining whether the many committees involved in formulating the MDGs throughout the 1990s chose a particular goal because of its intrinsic desirability, because of the ease with which it can be measured, or indeed, for some combination of the two.
3 Minimum standards in these areas were established in the MLA surveys.
4 A thorough analysis can be found in the papers edited by Atchoarena and Gasperini (2003).
5 See, for example, Michaelowa (2001).
6 Personal communication from V. Chinapah, 16 August 2005.
7 They certainly matter more from the point of view of a country's technological capabilities.
8 There is a very large literature on this topic, much of it under the heading of 'inappropriate technologies'. See, for example, Stewart (1987) and James (1995).
9 This is clearly the correct interpretation of Target 18, but less obviously so in regard to ICT, where the Target speaks of bringing the benefits to the poor, rather than expanding their access to these technologies. However, the indicator used to measure progress in this area uses conventional access measures such as numbers of computers.
10 This section draws on James (2000).
11 This represents an example which, from the point of view of the literature predating ICT, was referred to as 'inappropriate technology' (see note 8).
12 A review of the evidence is contained in UNESCO (2005).

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