

Three Healthy Cows

Evaluating development programs through a participatory framework: Biogas technology and the Kamalnayan Jamnalal Bajaj Foundation

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Abstract

Who has ownership of the international development process? The issue of "participation" has intensified over the last fifteen years following a renewed emphasis on improving health, education, and gender rights. Debates over participation have complicated the targets set forth in the UN Millennium Development Goals in 2000. The 20th century witnessed significant challenges to the equitable participation of developing regions in engaging with their own development. Additionally, this period gave rise to attempts to redress these issues at both the local and international scale. "Participation" has garnered criticism from some sectors of the development community due to the proliferation of the term in reference to a wide range of theories and practices of varying credibility. Nevertheless, the fundamental concept of participation, i.e. who is included and who has ownership in the process, is a useful framework with which to judge the quality of development enterprises at any scale. Chapter I of this thesis offers a historical analysis of international development that explains both the importance of participation in development and the landscape within which it finds itself today. Chapter II follows with an examination of biogas technology, widely used in developing regions, both as an effective tool in expanding the number of individuals who benefit from and can participate in development programs. Chapter III is a case study of the Kamalnayan Jamnalal Bajaj Foundation, based in Wardha, Maharashtra, India, that identifies the challenges facing NGOs and local groups in carrying out equitable development programs centered on community participation.

To Sam, Mom and Dad

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Preface

Development is a term that has currency in a wide range of fields and consequently refers to many different ideas and concepts. The general breadth of applicability of the term *development* necessitates its disambiguation. One can speak of personal development, child development, psychological development, or real estate development, etc. None of these are the particular understanding of development as it will be used here. Rather, this thesis is an undertaking in *international development*. This term is akin to an umbrella of sorts, under which individuals with different backgrounds and motivations might intend particular meanings. Broadly, international development concerns itself with the improvement in standard of living in areas outside of highly industrialized societies like those of Western Europe, the United States and Canada, or Japan.

Depending on one's interpretation, international development might really imply development in any or all of the following areas: economics, politics, education, agriculture, health, finance, sanitation, water, or human rights. Others still might include regional or rural development, which spans the many hundreds of thousands of local organizations, NGOs, and international agencies working toward many of the same goals as in international development. The focus of this thesis is in part an attempt to gain insight into how interpretations of international development are reflected in the motivations, behaviors, and attitudes of those responsible for practicing development among these various sectors. In this way, the research presented herein offers a meta-understanding of how those who engage in international development themselves understand and reconstitute its meaning. However, this is not a linguistic endeavor. Rather, it is an exercise that is very much embedded in international development itself – this work also constitutes an argument about the practice. While development means different things to different actors and stakeholders across seemingly disparate domains, this work explores whether it is feasible or valuable to attempt to unify otherwise disparate scales and approaches to development through a single framework – participation.

There is no such thing as a perfect development intervention. The reality is that globalized interactions between states, organizations, communities, and other actors is of enormous and ever-increasing complexity. In this context, every organization, regardless of scale, has a learning curve. This is as true for the Catholic Church as it is for the government of the United States. It is perhaps naïve to suggest that it is possible to completely eradicate all elements of development programs that are now seen as problematic, much less design new interventions that are free of such elements altogether. Some might rightly argue that it is unwise or simply unfair to judge the actors of the past according to standards that are only applicable in hindsight. Often lost in the criticism of the development community is the simple fact that most, if not all, actors are genuinely interested in doing

good in the places in which they work. Nevertheless, targeted criticism is a powerful tool in identifying areas in which to improve the way organizations conduct development interventions. We must take for granted that the limited capability of any particular development initiative entails that some stand to benefit more greatly than others. The goal of improving development programs should then be to optimize the multiplier effects on the benefits brought about such programs, to benefit the maximum number of individuals possible. This is the fundamental task of this thesis.

Who has ownership of the international development process? The issue of “participation” has intensified over the last fifteen years following a renewed emphasis on improving health, education, and gender rights. Debates over participation have complicated the targets set forth in the UN Millennium Development Goals in 2000. The 20th century witnessed significant challenges to the equitable participation of developing regions in engaging with their own development. Additionally, this period gave rise to attempts to redress these issues at both the local and international scale. “Participation” has garnered criticism from some sectors of the development community due to the proliferation of the term in reference to a wide range of theories and practices of varying credibility.

Nevertheless, the fundamental concept of participation, i.e. who is included and who has ownership in the process, is a useful framework with which to judge the quality of development enterprises at any scale. Chapter I of this thesis offers a historical analysis of international development that explains both the importance of participation in development and the landscape within which it finds itself today. Consequently, this first chapter is decidedly global in scale, drawing on historical examples from many different regions which found themselves at one point or another the focus of the international development community. Chapter II follows with an examination of biogas technology. As such, the second chapter shifts scales entirely – narrowing in from the international perspective of the first chapter to focus specifically on the use of a single technology in rural development. Biogas is widely used in developing regions both as an effective tool in expanding the number of individuals who benefit from and can participate in development programs. This analysis of biogas is able to provide greater insight into the role that stakeholders at multiple scales of development play in managing equitable development projects through the use of technologically-oriented interventions. This targeted exploration of a single form of development intervention serves as a means to illustrate the kinds of challenges that participatory approaches to development is meant to address and to assess the capacity to do so. Chapter III is a case study of the Kamalnayan Jamnalal Bajaj Foundation, based in Wardha, Maharashtra, India, that identifies the challenges facing NGOs and local groups in carrying out equitable development programs centered on community participation.

Chapter I

As a framework for development, participation reflects a recognition in contemporary development circles of the importance of the involvement of local peoples in decision-making processes. Their participation acts as a form of empowerment, and acknowledges the rights of these groups.¹ The rhetoric of participation has entered the common parlance of the development community. The word 'participatory' has proliferated in meaning and practice among researchers and practitioners. Some have criticized participation as having lost its connection to its theoretical foundation.² Indeed, these criticisms may be rightfully lodged against this sort of nominal participation in development. Even so, the fact remains that participation serves as a means of addressing a long history of implicit and explicit exclusion of the peoples of developing countries from acquiring agency in the process of development. Adherence to particular techniques and methodologies that either do or do not bear the moniker of "participation" is an ill-equipped solution. Rather, the application of participation as a guiding principle across scales of development allows initiatives to take on a wide variety of forms and exhibit an approach that is geared toward the meaningful inclusion of individuals and communities. Participation can also introduce new inequities in the development process through the participatory framework itself.

To illustrate the importance of a unified approach to development, this chapter begins with a brief overview of some of the ways that development practice and thought has tended to exclude members of the developing world. This is accomplished through a brief discussion of the impact of imperial legacies on development and the lasting effect of Western dominance in economic development thinking during the twentieth century. Because much of development as it is understood at the macro-level involves the use of measurement, the next section highlights the ways in which prominent approaches to measuring development have reflected particular values and objectives in the development process. Participation then becomes the central focus of the remainder of the chapter. First, the importance of participation is addressed in terms of its ability to challenge the problematic legacy of the development agenda by serving as a counterexample to these established norms. This point is then expanded by examining the role of participation in establishing the autonomy of local peoples through engagement in the development process, followed by an exploration of how participation as a form of thinking about development (rather than a set of static techniques or methodol-

¹ Samuel Paul, "Community Participation in Development Projects," *World Bank Discussion Papers* 6 (1987), http://www.wds.worldbank.org/servlet/WDSCContentServer/WDSP/IB/1999/09/21/000178830_98101903572729/Rendered/PDF/multi_page.pdf.

² Andrea Cornwall and Garrett Pratt, "The Use and Abuse of Participatory Rural Appraisal: Reflections from Practice," *Agriculture and Human Values* 28, no. 2 (n.d.): 263–72, doi:10.1007/s10460-010-9262-1.

ogies) is capable of unifying the goals and objectives of institutions across multiple scales. The chapter concludes by addressing some of the inherent challenges (brought upon by operational, social or cultural factors, etc.) of conducting development according to a participatory framework.

Implications of Eurocentrism in International Development

The past century has seen the practice of international development inexorably tied to the political and economic motivations of Europe and the United States. For each of these two world powers, the relative wealth of states, many of whom previously maintained colonial empires, drove policies intended to further solidify their wealth and garner greater political influence on the world stage. Although the United States does not have a colonial past in precisely the same way as do the former empires of Europe, the twentieth century nevertheless saw attempts by the United States government to employ development as a strategy to further its political and economic influence during the Cold War era. The case of international development practice on the part of both Europe and the United States during this period illustrates the complicated relationship in which the developed and developing countries currently find themselves.

Europe continues to contend with the legacy of colonialism – a relationship that governs the interaction between the continent and much of the rest of the world. This is a state of affairs with direct implications for how international development is conducted, and is best demonstrated through a brief examination of a few critical interactions between Europe and its colonies during the past century. In 1884, the Berlin West African Conference began. The conference marked the gathering of representatives of Europe's leadership to determine the economic and political future of Africa, and effectively divided the territory of the continent among the various European powers.³ Those present carved swaths of the continent into parcels of land with disregard for the existing ethnic, linguistic, and cultural boundaries already in place among the African people.⁴ The European states at the Berlin Conference concerned themselves with the apportionment of the continent's resources and territories, and how their division would impact the balance of power within Europe

³ G.N. Uzoigwe, "The Results of the Berlin West Africa Conference: An Assessment," in *Bismarck, Europe, and Africa: The Berlin Africa Conference 1884-1885 and the Onset of Partition*, ed. Stig Förster, Wolfgang J. Mommsen, and Ronald Edward Robinson (Oxford; New York: German Historical Institute in London. Oxford University Press, 1988), 543. Uzoigwe rebukes earlier historians of the Conference, notably Sybil E. Crowe, who claimed that the Conference was not the impetus for the partition of Africa and was therefore not a consequential event. Uzoigwe instead points to how the Conference is situated within the larger framework of European colonialism.

⁴ Ibid. 548. Uzoigwe notes that "tribalism" was deliberately introduced by colonial powers as a method of maintaining control over the populace. The ethnic chauvinist successors to the colonial regime, maintains Uzoigwe, continued to foster ethnic discontent to further their own political ends (p. 548).

itself.⁵ From this conference, Britain, France, Germany, and notably Belgium⁶ came away with significant holdings in Africa. Upon the conclusion of the conference, the stage had been set for the entirety of Africa to be parceled out to the European powers.

One might think it natural today that, when a meeting is held to determine the development agenda for the African continent, representatives of the various peoples and institutions of Africa would participate in that conference and enjoy a substantial degree of decision-making power over that agenda. Unfortunately, for much of modern history, full presence and participation of native groups in determining the fate of their countries and livelihoods has been a relatively recent development, rather than the norm. Instead, Europeans have dictated the agenda of political and economic affairs of their colonial holdings, which were geographically and culturally distant places of which they had very little understanding. Naturally, such a system as this, wholly insensitive to local circumstances and the lives of the local people, ended disastrously.⁷ The course of history on the African continent from the Berlin Conference onward has involved negotiating the complications brought upon by the actions of that conference. More than once it has ended in tremendous loss of life.

The implications of this conference are deep in terms of the effect on the future of Africa. Among many other issues that stemmed from the colonization of Africa, the insensitivity to the geography, history, and sociocultural context of the various regions of the continent with which colonization was carried out generated over a century of ethnic and racial strife. These social conflicts were exacerbated as fledgling independent African states struggled in the latter decades of the twentieth century to build stable nations among diverse and occasionally antagonistic ethnic and cultural divides.⁸ The Rwandan Genocide of 1994, in which ethnic Hutu supremacist groups coordinated the systematic annihilation of the Tutsi minority (historically privileged by French and Belgian authorities) is particularly emblematic of the grave social plight the European domination of Africa inflicted upon the continent.⁹ The Berlin Conference in 1884 serves as just one symbolic example indicative of the approach the European colonial powers took toward Africa and their territorial possessions in

⁵ Wolfgang J. Mommsen, "Bismarck, the Concert of Europe, and the Future of West Africa, 1883-1885," in *Bismarck, Europe, and Africa: The Berlin Africa Conference 1884-1885 and the Onset of Partition*, ed. Stig Förster, Wolfgang J. Mommsen, and Ronald Edward Robinson (Oxford; New York: German Historical Institute in London. Oxford University Press, 1988), 169. Mommsen delineates in great detail how the Conference was intended to renegotiate the existing balance of power between the major Western European powers.

⁶ For more information on the history of Belgian rule in the Congo Free State, see: Adam Hochschild, *King Leopold's Ghost: A Story of Greed, Terror, and Heroism in Colonial Africa* (Boston: Houghton Mifflin, 1998).

⁷ Uzoigwe, "The Results of the Berlin West Africa Conference: An Assessment." 541. Uzoigwe elegantly remarks that the Conference marked the first time in recorded history that the leadership of one continent conspired together to parcel out another continent "without the knowledge of the latter's leaders" (p.541). This, Uzoigwe claims, was a dangerous precedent and one that I argue characterizes much of Europe's attitude toward the rest of the world throughout the twentieth century.

⁸ Uzoigwe, "The Results of the Berlin West Africa Conference: An Assessment." 546-548, 552.

⁹ Kenneth R. White, "Scourge of Racism: Genocide in Rwanda," *Journal of Black Studies* 39, no. 3 (January 1, 2009): 471-481, doi:10.2307/40282573. While some scholars rightfully argue that the complexities inherent in the causes of the Rwandan Genocide prevent one from claiming that colonial legacy was the driving factor in the genocide, racial instigation by Belgian authorities certainly played its part. In this piece, White highlights briefly the social identification cards employed by the Belgians which conferred greater privilege to those with the physical features of the Tutsi ethnic group (p. 474).

the rest of the world. This exploitative attitude on the part of European governments by and large persisted for the next hundred years and beyond.

That this sentiment persisted so long is difficult to dispute in light of the fact that the European colonial powers retained control of their global possessions for much of the twentieth century, in some cases only granting sovereignty following the end of long and bloody wars for independence. The reluctance to part with colonies was especially true of France. The persistence of the French in attempting to retain their colonial authority in Algeria and former Indochina by engaging in protracted conflicts (8 and 7 years long, respectively) highlights the fact that even at this time France believed that the value of the colonies and their peoples was rightfully and exclusively reserved for the European homeland.¹⁰ It should be noted that Britain granted independence to most of its colonies more rapidly and more peacefully than did France or Portugal, both of whom engaged in a successive string of revolutionary wars in the mid-twentieth century.¹¹ In both the case of Britain and France, voluntary leagues of nominal allegiance to the states that comprise their former empires were established to retain formal ties among the dependencies. The former British colonies became the Commonwealth of Nations and the former French colonies the *Organisation Internationale de la Francophonie* (OIF).

While the twentieth century saw the end of overt colonial rule, the framework of colonialism nevertheless persists, and in fact typifies the relationship between Europe and the rest of the world with regard to development assistance. Official development assistance (ODA), provided by many developed nations to the governments of states currently undergoing development, is a realm in which the legacy of colonialism presents itself starkly. For both the United Kingdom and France, the top nations to which they provide ODA is dominated by their respective former colonies (Table 1). To illustrate this trend, the top three largest recipient nations of ODA from the U.K. each year in the 7-year period from 2005-2011 were at one point former colonies, protectorates or mandates of the United Kingdom, with the sole exception of Ethiopia.¹² For France, 66% of the top ten recipients of French ODA were former colonies or protectorates during the period from 2005-2011; for the United Kingdom, 85% fall into that category.¹³ While one might not necessarily hold a negative opinion about the preferential selection of former colonies in the ODA allocation process, the point made here

¹⁰ Alistair Horne, *A Savage War of Peace: Algeria, 1954-1962* (New York: Viking Press, 1978). Horne's comprehensive analysis of the Algerian revolution begins with a telling remark: "Many a French leader... waged the war in the good faith that they were, indeed, shouldering the 'White Man's Burden'... assured that he was defending a bastion of Western civilization" (p. 14).

¹¹ David B. Abernethy, *The Dynamics of Global Dominance: European Overseas Empires, 1415-1980* (New Haven: Yale University Press, 2000). 147-159.

¹² Organisation for Economic Co-operation and Development, and Development Assistance Committee, *Geographical Distribution of Financial Flows to Developing Countries Disbursements, Commitments, Country Indicators. 2012*. ([Paris]: OECD, 2013), <http://site.ebrary.com/id/10682430>.

¹³ Ibid.

is that in the crucial question of who is prioritized by the development community, the legacy of centuries of colonialism permeates contemporary policies. For better or for worse, the European development agenda is inextricable from its imperial past.

In a similar vein, the twentieth century witnessed a foreign policy agenda in the United States that sought to use development aid as a key component of furthering cooperation among leaders of developing countries. The policy areas the United States sought to influence were the containment of communism during the Cold War era and later in the promotion of neoliberal reforms. The imperative to halt the spread of communism to additional states following the rise in global prominence of the Soviet regime after World War II proved to be a major justification and impetus for the provision of development aid as a means of securing cooperation in this cause. In the immediate post-war period, this strategy was exemplified by the introduction of the Truman Doctrine in a speech by President Truman in 1947, in which sorely needed development aid was granted to the governments of Greece and Turkey with the express purpose of dissuading these two states from embracing communism.¹⁴ It is important to acknowledge that the motivation of the United States in providing aid to other countries during this period was less characterized by an altruistic desire to alleviate the social ills of underdeveloped states, but more-so the need to combat the spread of political ideology considered aversive to U.S. interests.

This state of affairs is further highlighted by the strategic introduction of the Marshall Plan following the end of WWII. Begun in 1948 under the formal title of the "European Recovery Program," the plan involved providing official development assistance to the nations of Western Europe so as to facilitate recovery from the debilitating effects of the war. The plan provided approximately \$12 billion in aid over four years,¹⁵ with the expectation that the assistance would reduce internal political and social turmoil threatening a turn to communist sentiment among European populations. Widely hailed as a success, the Marshall Plan is commonly cited as a justification for the United States to actively engage in the provision of aid to developing countries because the recovery assistance promoted free markets and democratic institutions in those societies.¹⁶

¹⁴ Harry S. Truman, "PRESIDENT HARRY S. TRUMAN'S ADDRESS BEFORE A JOINT SESSION OF CONGRESS, MARCH 12, 1947" (National Archives), Document 171; 80th Congress, 1st Session, Records of the United States House of Representatives; Record Group 233, http://avalon.law.yale.edu/20th_century/trudoc.asp. The intent of President Truman's economic assistance program are made remarkably stark toward the conclusion of his speech: "This is an investment in world freedom and world peace. If we falter in our leadership, we may endanger the peace of the world -- and we shall surely endanger the welfare of our own nation." See also: Nick Cullather, *The Hungry World America's Cold War Battle against Poverty in Asia* (Cambridge, Mass.: Harvard University Press, 2010), <http://site.ebrary.com/id/10456065>.

¹⁵ Martin Schain, *The Marshall Plan: Fifty Years after* (New York: Palgrave, 2001).

¹⁶ Cowen, Tyler, "The Marshall Plan: Myths and Realities," in *U.S. Aid to the Developing World: A Free Market Agenda*, ed. Doug Bandow, Critical Issues (Washington, D.C. (214 Massachusetts Ave., N.E., Washington 20002): Heritage Foundation, 1985), 61-74, http://www.gmu.edu/centers/publicchoice/faculty%20pages/Tyler/Marshall_Plan.pdf. An influential economist who in this piece writes for the conservative think-tank the Heritage Foundation, Cowen rejects the notion that the Marshall Plan was beneficial to free markets and democracy. Cowen discusses in particular the heightened levels of graft, earmarking, and other levels of corruption that was witnessed in Europe (most notably Greece) as a result of American recovery funding.

While few might have considered the provision of ODA in return for political cooperation problematic during the twentieth century, it is certainly the case that this style of policymaking reduces the autonomy of those nations dependent on such assistance. This mentality is inherent in development policies that were advocated for and espoused by the United States in the last decade of the twentieth century. During this period, the approach to policy adopted by researchers in the United States and the U.S.-based Bretton Woods institutions (the World Bank and the International Monetary Fund) was characterized by the Washington consensus and the introduction of structural adjustment programs. The Washington consensus reflected the belief that struggling Latin American states should embrace a series of neoliberal reforms and undergo significant privatization of government industries in order to revitalize their failing economies.¹⁷ The World Bank and the International Monetary Fund, both of whom are critical sources of aid for developing nations, fervently espoused this philosophy, which was subsequently incorporated into the development strategies implemented by these organizations.¹⁸ The failure of liberalization to bring about significant economic change in these states led many commentators at the beginning of the twenty-first century to claim that the Washington consensus had failed.¹⁹ In turn, much criticism was placed on the influence of the Bretton Woods institutions, with advocates charging these groups with furthering political agendas instead of acting in the best interest of the developing states. Consequently, the idea of making alterations to the Breton Woods institutions grew in popularity.²⁰

The practice of structural adjustment was instituted in a similar manner from the middle of the twentieth century and onward. Structural adjustment refers to the programs set in place by the Bretton Woods institutions tying favorable loan terms and interest rates to the implementation of free-market policies in the borrowing country.²¹ An iteration on the ideals of the Washington con-

¹⁷ John Williamson, "The Washington Consensus and Beyond," *Economic and Political Weekly* 38, no. 15 (April 12, 2003): 1475–1481, doi:10.2307/4413431. Williamson originally coined the term "Washington Consensus" in 1989 when he issued a set of 10 targeted policy reforms intended to revitalize Latin American Economies. Williamson begins by remarking that the term "Washington consensus" as it is most often used by its assailants has been taken well out of the context of the original geographic specificity and targeted intent of his original to refer to the blind embrace of neoliberal reform in all developing countries. Still, the consensus was used in this manner by some in the U.S. Government and the Bretton Woods Institutions. "To the extent that this was true," writes Williamson, "one has to worry that those policy attitudes were too homogenized, and may have failed to allow adequately for regional and national differences in the nature of the economic challenges facing countries" (p. 1476).

¹⁸ Jane D'Arista, "Moving Beyond the Washington Consensus," *International Journal of Political Economy* 32, no. 4 (December 1, 2002): 22–34, doi:10.2307/40470818. Acknowledging that the Washington Consensus diverged from Williamson's original intent, D'Arista discusses the particularly devastating effects on developing economies of the IMF and its near-dogmatic adherence to a neoliberal policy agenda.

¹⁹ Ha-Joon Chang and Ilene Grabel, "Reclaiming Development from the Washington Consensus," *Journal of Post Keynesian Economics* 27, no. 2 (December 1, 2004): 273–291, doi:10.2307/4538924. The authors argue that policy alternatives to neoliberal reform would have better met the needs of developing countries.

²⁰ D'Arista, "Moving Beyond the Washington Consensus."

²¹ Brian F. Crisp and Michael J. Kelly, "The Socioeconomic Impacts of Structural Adjustment," *International Studies Quarterly* 43, no. 3 (September 1, 1999): 533–552, doi:10.2307/2600942. In their introduction, the authors describe typical SAPs: "...demands for fiscal discipline, new public spending priorities, tax reforms, financial liberalization, competitive exchange rates, trade liberalization, increased foreign direct investment, privatization, and deregulation" (p. 534). Interestingly, this study found that there was a positive relationship

sensus, structural adjustment involved little to no participation from borrowing countries in the generation of required policies for acceptance of the loan.²² Instead, the policies imposed a set of conditions that largely fall in line with the pro-free market foreign policy agenda that the United States espoused at the time. Taken in tandem, the Washington consensus and the specific policy practices of structural adjustment reflect a persistent trend that saw development as a tool in the effort to propagate the interests of the United States overseas.²³ This trend has proved so persistent, in fact, that its legacy is felt even today through the use of economic sanctions as a tool for securing compliance with international security demands. The last several years have witnessed deviant states like Iran and North Korea placed under heavy economic sanctions by the U.N. as a result of their stance on the development of nuclear technology.²⁴ Nearly a century of utilizing development assistance as a foreign policy tool has cemented its place as one of the most importance and widely accepted means of furthering compliance with Western political interests among the international community.

While Europe no longer retains political control over its former colonies, the relationship between these entities is nevertheless typified by their shared colonial past and is inextricable from it. Likewise, the United States employed development assistance to great effect in furthering particular efforts in halting the spread of communism and instigating neoliberal reform in developing countries. Such actions have established a modern precedent for the kind of “development as bargaining chip” witnessed today in international diplomacy. In seeking opportunities to reform, the development community must necessarily contend with a troubling and problematic legacy.

Imposing Westernization on the development agenda

Furthermore, it is important to note that the very notion of what development itself means has meant, to some degree, Westernization. In some cases, this was reflected implicitly in the prevailing development philosophies of the time – such as with the popular models of “progress” en vogue among development economists at the middle of the century. Still in other instances, the ideal of Western superiority takes on an explicit form through those that advocated the adoption of Western

between structural adjustment and declining poverty and inequality, although the authors note that universal claims about the program are not warranted based on this analysis.

²² International Monetary Fund, “Factsheet -- Poverty Reduction Strategy Papers (PRSP),” *International Monetary Fund*, September 24, 2013, <http://www.imf.org/external/np/exr/facts/prsp.htm>. The successor to structural adjustment, the IMF Poverty Reduction Strategy Papers place “national ownership” as one of its core principles in an effort to emphasize the participation of the developing country in the process.

²³ M. Rodwan Abouharb and David L. Cingranelli, “The Human Rights Effects of World Bank Structural Adjustment, 1981-2000,” *International Studies Quarterly* 50, no. 2 (June 1, 2006): 233–262, doi:10.2307/3693610. Abouharb and Cingranelli offer a fascinating empirical study that found that implementing a structural adjustment loan decreased the government of the borrowing country’s “respect for all types of physical integrity rights” (p. 256). The study serves as a reminder that, even when intentions are pure, international interventions run the risk of causing harm as well as good.

²⁴ Akbar E. Torbat, “Impacts of the US Trade and Financial Sanctions on Iran,” *World Economy* 28, no. 3 (March 1, 2005): 407–434, doi:10.1111/j.1467-9701.2005.00671.x. While the economic effect of sanctions have been dramatic, the political effect (perhaps until relatively recently) has been minimal in terms of compliance with U.S. security demands.

socioeconomic practices among the developing countries. In either form, the presence of attitudes underscoring belief in Western superiority are inherent in the literature on development in the twentieth century.

The implicit cultural valuation present in the works of Western development theorists is evident in the emphasis on the ideal of “progress” that is commonly present. Eminent economic development scholars of the mid-twentieth century – including Walt Rostow and W.A. Lewis – published works that attempted to deconstruct the development process in an attempt to both describe past economic successes and provide a framework for setting development policy for other countries moving forward. In each of these models, the ultimate objective stage in the process of economic growth reflected the state of European and North American industrialized economies at the time. Therein, the notion of progress to that stage implies that “Westernizing” is the primary goal of development efforts. Take, for instance, the work of late economist Walt Rostow in his seminal book, *The Stages of Economic Growth: A Non-Communist Manifesto*, in which he delineates a series of five stages through which societies pass on their path toward economic development.²⁵ These stages begin with a “traditional” society, transition through a “take-off” period, and ultimately end in a period of high mass consumption that is modeled after the experience of Western countries. Rostow’s five stages became wildly popular in economic and development circles during the Cold War era, and reflected belief at the time that “development” was in most respects a game of “catch-up” to earlier Western industrialization.

One purpose of Rostow’s “non-communist manifesto” was to offer an ideological counterpoint using a similar “stages”-based approach to history as that of Marx’s economic stages model of the evolution of civilizations described in his 1859 *Preface to A Contribution to the Critique of Political Economy*. While the final stage of the respective models are wildly divergent – Rostow’s being an expression of capitalist ideology and free-markets, and Marx’s an international socialist workers’ coalition – the two works both reflect the common rhetoric of “progress” as it was inherited by the West’s longstanding Enlightenment tradition. For Marx and Rostow, the ideal stage of civilizations took on a particular manifestation of distinctly Western political ideologies. It is worth noting briefly that during the time of Rostow’s publication that the work had caused a great deal of controversy within the intellectual community.²⁶ In fact, the theory became important in the justification of cold war development policy – facilitating economic growth as per Rostow’s model would purportedly

²⁵ W. W. Rostow, *The Stages of Economic Growth: A Non-Communist Manifesto*, 3rd ed (Cambridge [England] ; New York: Cambridge University Press, 1990).

²⁶ H. J. Habakkuk, “The Stages of Economic Growth. A Non-Communist Manifesto. by W. W. Rostow Review by: H. J. Habakkuk,” *The Economic Journal* 71, no. 283 (September 1, 1961): 601–604, doi:10.2307/2228926.

foster the development of capitalist states (read: stem the growth of communist ideology among developing nations).²⁷ Such use illustrates the degree to which development according to Western standards was both a natural and desirable consequence for development theorists at the time.

The work of development economist W.A. Lewis in his influential "Economic Development with Unlimited Supplies of Labour," published in 1954, offers another economic model in which Western capitalism and mass consumption are proffered as the resultant state of developing economies. The Lewis model more specifically describes societies as undergoing a transition from rural, agricultural based economies to urban, industrially-based economies.²⁸ The implication of the Lewis model is that investment in the agricultural sector would not provide a worthwhile return because development entails a shift away from this sector. This led to a period in which agricultural development policy produced a dearth of investment in talent, capital, or other resources with which to support the struggling industries in developing countries. It comes as no surprise that the Lewis model reflected the experiences of European and North American economies that by that point had become largely reliant on large, industrial urban centers for the majority of their economic productivity. The implicit demand of the Lewis model becomes, then, "be more like the West" and urbanize.

During the 1950s and 1960s, the idea of "community development" became a popular approach to organizing development projects in Third World countries. Under the community development approach, governments and large international organizations would pledge substantial funding and other aid to local development projects, which would be organized at the grassroots level with the assistance of a "Village Level Worker" (VLW). It was the task of the VLW to interface with existing bureaucracy and coordinate the efforts of local communities, who would be responsible for carrying out the development projects themselves.²⁹ Additionally, the United States bankrolled community development initiatives believing that scientific advancements in agriculture made in its own rural areas would spearhead development in rural areas elsewhere in the world. Consequently, there was initially much optimism about the United States' role in sponsoring community development among American policymakers and donors.³⁰ However, there are important criticisms that can be made about the role of community development in developing regions. Among these, the failure of existing bureaucratic institutions and structures to coordinate effectively with grassroots organizers and lo-

²⁷ Donald E. Voth, *An Overview of International Development Perspectives in History: Focus on Agricultural and Rural Development*, Staff Papers (University of Arkansas, Department of Agricultural Economics and Agribusiness, 2004), <http://purl.umn.edu/15776>.

²⁸ W. ARTHUR LEWIS, "Economic Development with Unlimited Supplies of Labour," *The Manchester School* 22, no. 2 (May 1, 1954): 139-191, doi:10.1111/j.1467-9957.1954.tb00021.x.

²⁹ Donald E. Voth, *An Overview of International Development Perspectives in History: Focus on Agricultural and Rural Development*, Staff Papers (University of Arkansas, Department of Agricultural Economics and Agribusiness, 2004), <http://purl.umn.edu/15776>.

³⁰ Cullather, *The Hungry World America's Cold War Battle against Poverty in Asia*.

cal elites led to a poor record of achievement that critics of community development readily highlight.³¹ Even so, community development fostered a level of interaction between local, regional, national, and international groups that left an indelible footprint on the governments and future course of development in the countries in which it was practiced.³² The mixed legacy of community development in the mid-twentieth century stands as a precursor to contemporary discussions about the participation of local groups in rural development. Undoubtedly for some commentators, the experiences of community development form the historical precedent by which modern attempts at participatory approaches will be evaluated.

There existed within the development community at this same time a level of explicit value placed on Western socioeconomic customs that misunderstands the importance of the peoples of developing regions. This was done not necessarily out of an overt antagonism for other cultural practices, but rather out of a genuine conviction that some methods of socioeconomic interaction (i.e. Western business customs) best facilitated growth along the lines of the economic models previously mentioned. Development researcher Everett Rogers noted in 1969 that the prevailing attitude among researchers and practitioners toward peasants in developing countries was overwhelmingly negative at that time.³³ The stereotype, claims Rogers, depicts a group that is excessively “backward” and resistant to the implementation of any kind of social change – overall a generally disdainful tone emerges from the literature. Rogers’ literature review is indicative of the attitudes toward the peoples who were the subjects of development policies at that time – the models of economic growth offered by scholars like Rostow or Lewis offered a means of “enlightening” peasant groups and placing them on a path toward one day embracing Western-style civilization. Agricultural development researcher Donald Voth notes that such a sentiment existed in tandem with an exaltation of Western cultural values, among them entrepreneurship.³⁴ This juxtaposition that Voth delineates between the Western celebration of achievement versus the perception of peasants as “stagnant” underscores the inherent sense of superiority with which Eurocentric development practitioners engaged with the developing world.

³¹ Voth, *An Overview of International Development Perspectives in History: Focus on Agricultural and Rural Development*.

³² Daniel Immerwahr, “Dissertation Abstract: Quests for Community: The United States, Community Development, and the World, 1935–1965,” *Journal of Economic History*, 2013. Immerwahr provides an in-depth account of the implications of community development in the nations of the Global South.

³³ Rogers, Everett M., “Motivations, Values, and Attitudes of Subsistence Farmers: Toward a Sub-Culture of Peasantry,” in *Subsistence Agriculture & Economic Development*, ed. Clifton R. Wharton (Piscataway, NJ: AldineTransaction, 2008), 111–135. Originally published in 1969. Rogers mentions his review of the development literature in the introduction to this essay, the remainder of which provides a systematic examination of difference in cultural attitudes and beliefs of the peasantry that practitioners must be cognizant of when engaging with local communities in order to maximize the effect of their interventions. As such, Rogers’ work provides evidence that, despite the widespread trend otherwise, some researchers and practitioners recognized the importance of native peoples in the development process.

³⁴ Voth, *An Overview of International Development Perspectives in History: Focus on Agricultural and Rural Development*.

In this way it becomes clear that both implicitly and explicitly the development community of the twentieth century propagated attitudes about development that conformed to Eurocentric standards about how and by what means a country should develop. This predominantly took the form of modeling development after the experiences of Europe and the United States, applying a notion of "progress" whose ultimate stage signified the achievement of a Western-like level of capitalist mass-consumption. That "growth" meant "Westernize" was made abundantly clear in the attitudes expressed by development researchers and practitioners themselves, who in the mid-twentieth century at times expressed a disdain for the livelihoods of the people they purportedly sought to assist. Coming to terms with and attempting to rectify that Western bias has been a significant challenge that persists even in the current development climate.

The examination of ideas, actions and events brought forth so far sought to illustrate the wide-reaching implications that the history of Eurocentrism has had on the development community. This history has imposed upon the world a colonial legacy of which neither former colony nor colonizer can extricate itself. The past century further saw the use of development aid become a powerful means of securing cooperation among developing states on foreign policy objectives. In some cases, the policy impositions proved valuable in providing stability to regions; in others, they did little to support struggling developing economies. Intentions aside, the ends reflected in the international development agenda during this period belie a bias toward Western ideals, with development objectives structured accordingly. While in many cases this Western bias was implicit to the logic of economic growth models, in other cases the attitudes of development community reflected a distinct preference for Western sociocultural values. Much has been written in an attempt to address many of the criticisms of these development practices.³⁵ An analysis of the effectiveness of these attempts, and the new challenges that they bring about, will be necessary in creating the best possible development community capable of conducting itself free of the mistakes of its past.

Measuring Development

The role of aggregate indicators in development

Few people in the developed world over the course of their daily lives have the opportunity to experience first-hand the lives of their counterparts living in the developing world. Rather, their knowledge is mediated by what is seen, read, and heard about those individuals living in other parts of the world. Television depicts refugees afflicted by war, or distraught families in villages crushed

³⁵ See Ha-Joon Chang and Grabel, "Reclaiming Development from the Washington Consensus," and Abouharb and Cingranelli, "The Human Rights Effects of World Bank Structural Adjustment, 1981-2000."

by natural disaster. Many places in sub-Saharan Africa have entered popular imaginations as a backward, “wild” place.³⁶ Beyond these tropes in the popular consciousness, however, even the institutions and organizations whose mission it is to understand the developing world and implement strategies to improve its quality of life engage with a mediated representation. This is due to the fact that “development” is a phenomenon that is primarily understood through measurement. That is, the use of statistics is the primary means by which international development researchers and policymakers identify and assess the standard of life in each of the world’s countries. Today, the development community employs a host of different kinds of indicators that are meant to provide unique insight into each country and the lives of those that live there.

Three of the most often cited are: the gross domestic product, which measures the total economic productivity of a nation’s populace over the course of a year;³⁷ the Gini income inequality coefficient, which measures the inequality in the distribution of incomes in a country and assigns a value between 0 (perfectly equal) and 1 (maximum inequality);³⁸ and the human development index, which incorporates gross national income (GNI) per capita, life expectancy at birth, and mean and expected years of schooling³⁹ in order to provide an impression of the overall quality of life and state of human development relative to other nations.⁴⁰ Aside from these three aggregate indicators, virtually every possible economic and social category is tracked in an effort to better understand the state of a country’s development and how it has changed over time.⁴¹ At the international level, it is thus foremost through databases that development practitioners “know” the process of development.

By their very nature, development indicators are derived through measurement and are proxies for the qualities that they represent. This abstraction from the quality itself is not devoid of its own set of value judgments, as some may contend. Development economist Amartya Sen notes that the simple act of electing some quantities to measure and others to ignore is indicative of the

³⁶ Marilyn Kern-Foxworth, “The Effect of Advertising Stimuli on American Perception of Africa: A Descriptive Analysis,” *Journal of Black Studies* 16, no. 2 (December 1, 1985): 155–168, doi:10.2307/2784259.

³⁷ Tim Callen, “Gross Domestic Product: An Economy’s All,” *International Monetary Fund: Back to Basics: Finance & Development*, March 28, 2012, <http://www.imf.org/external/pubs/ft/fandd/basics/gdp.htm>.

³⁸ Inc. SAGE Publications, “Gini Coefficient. Encyclopedia of Social Science Research Methods. SAGE Publications, Inc.,” 2004, <http://dx.doi.org/10.4135/9781412950589>.

³⁹ Khalid Malik and United Nations Development Programme, “Technical Notes,” in *Human Development Report 2013: The Rise of the South: Human Progress in a Diverse World.*, 2013, http://hdr.undp.org/sites/default/files/hdr_2013_en_technotes.pdf. This methodology is current as of 2010; previously the education component used a ratio of adult literacy rate and gross school enrollment.

⁴⁰ Amartya Sen and Sudhir Anand, *Human Development Index: Methodology and Measurement* (New York: Human Development Report Office Occasional Paper 12, 1994).

⁴¹ One such comprehensive database, the World Databank (hosted by the World Bank) comprises 51 separate databases, many of which contain several hundreds of different statistics relative to social, cultural, and economic characteristics of each country, such as the number of ATMs per 100,000 adults to the number of threatened animal species: The World Bank, “The World Bank DataBank,” Database, n.d., <http://databank.worldbank.org/data/home.aspx>.

implicit values that the development community upholds.⁴² For instance, through much of the past century and continuing even to the present day, the economic productivity of a country was widely regarded as synonymous with its level of development. First introduced in the United States by economist Simon Kuznets in 1934,⁴³ the GDP has seen its use coincide with a general prevalence of economic methodologies in the use of understanding development. Consequently, GDP is still often cited when making claims about the progress or lack thereof that a nation has made.⁴⁴ Its use ranges from headlines in the international media to forming the basis of international policymaking. In associating development with increases in economic productivity to such a strong degree, the development community rejects other, equally valid interpretations of what it means to develop.

To illustrate, indicators like the human development index, proposed by Sen in 1990, redefine the development experience not just as one of economic productivity, which is reflected by the incorporation of income as a proxy in the index, but also in terms of the increase in quality of individual lives. This latter portion is captured by measures of life expectancy and education, which approximate the increase in life opportunity correlated with increasing levels of education. Others, like the government of Bhutan, have flouted the existing indicators and their corresponding value judgments by imposing their own. Bhutan has famously implemented the measure of “gross national happiness,” which it abides by in setting national development and policy goals.⁴⁵ Whatever the value may be, the presence of some values and the absence of others is inherent in the process of measurement – which as Sen describes, inevitably results in the loss of some information.⁴⁶

Reflecting wellbeing through measurement

The methodology of measuring development and the kinds of quantities that get measured have changed over the course of the history of development. This change reflects a transition from the more exclusively economically-driven approaches of most of the twentieth century to the more holistic and socially-influenced forms of measurement of the 1990s onward. Among the development

⁴² Amartya Sen, “Economic Methodology: Heterogeneity and Relevance,” *Social Research* 71, no. 3 (October 1, 2004): 583–614, doi:10.2307/40971716. One of the claims that Sen argues is that it is an impracticable (perhaps foolish) endeavor to attempt an economics that is devoid of value judgments. Rather, Sen delineates a host of areas within the economic disciplines where value judgments are inextricable, and some cases even warranted in accomplishing the tasks they are set out to achieve.

⁴³ United States. Bureau of Foreign and Domestic Commerce, *National Income, 1929-1932: Letter from the Acting Secretary of Commerce Transmitting in Response to Senate Resolution No. 220 (72nd Cong.) a Report on National Income, 1929-32, 1934*, fraser.stlouisfed.org/docs/publications/natincome_1934/19340104_nationalinc.pdf.

⁴⁴ Simon S. Kuznets, “How to Judge Quality,” *New Republic* 147, no. 16 (October 20, 1962): 29–32. Kuznets himself cautions against conflating measures of economic productivity with welfare. This article highlights several of the methodological reasons why economic growth for growth’s sake is not a desirable policy objective, and how it does not always correlate to an increase in the standard of living.

⁴⁵ Gross National Happiness Commission, *SAARC DEVELOPMENT GOALS: Country Report* (Royal Government of Bhutan, August 2013), <http://www.gnhc.gov.bt/wp-content/uploads/2013/10/SDG-Country-report-20132.pdf>.

⁴⁶ Sen and Anand, *Human Development Index: Methodology and Measurement*. For example, intra-population inequality is not well-captured by aggregate indicators of (economic) development. The methodology report goes on to discuss how two groups with highly disparate levels of inequality appear similar to most aggregate income measures due to the property of averages. An attempt to account for this has been made with the introduction of the inequality-adjusted HDI in recent Human Development Reports (Khalid Malik and United Nations Development Programme, *Human Development Report 2013*.)

community at large, particularly among national governments and international policymaking institutions, the gross domestic product is perhaps the most widely-used aggregate indicator meant to capture in one figure the most important information with respect to a nation's development.

As development thought began to shift slightly from an exclusively economic focus to one that increasingly concerned itself more with social justice, the kinds of indicators used by the development community began to change as well. Although economic indicators retain a predominant influence, the information these indicators intended to capture now reflected an interest in the social implications of growth within individual nations. The measurement of income, and income inequality more specifically, was adopted as a means of understanding how development practices differentially impacted some sectors of society over others. Sen discusses the way the importance of the measurement of income has shifted alongside this trend herein described. According to Sen, exclusively economic orientations toward development value income as the end to which all other facets of development constitute the means by which to achieve it.⁴⁷ Toward the end of the century, however, development thinking underwent a reversal, as Sen suggests that income instead becomes a means by which other elements of development – nutrition, literacy, human security, etc. – are the ends to which one strives.⁴⁸ It is in this vein that Sen and his colleagues pioneered the human development index, which sought to capture this more nuanced and socially just representation of development.

Making measurement meaningful

Different stakeholders in the development process have alternative and sometimes competing criteria for what should be measured and how that measurement is to be done, given that they each possess a set of values and desired outcomes unique to their position and context in the process. Three broad classes of stakeholders carry their own unique requirements: researchers and policymakers, local development practitioners, and communities and individuals. Researchers and policymakers must accommodate the information from large quantities of people (often whole nations) and consequently stand to benefit the greatest from aggregate measurement methodologies. With such statistical methods it is possible to capture the essence of social and economic phenomena and implement policy that is then applicable to large quantities of people. For international institutions and policymakers, aggregate statistics like the GDP, Gini coefficient, and HDI are meaningful figures that constitute the primary means in which development is broadly understood.

⁴⁷ Sen and Anand, *Human Development Index: Methodology and Measurement*.

⁴⁸ Ibid.

The second class of stakeholders, local development practitioners who work directly with communities and individuals on small to medium-scale development projects, does not necessarily receive the same level of utility from aggregate indicators. Often times, wide variance characterizes the experiences of individual communities relative to the average represented by aggregate statistics, making statements pertaining to wide geographic areas less meaningful to those working in specific localities.⁴⁹ Instead, practitioners might rely on their personal knowledge of the local circumstances of an area and more regionally-specific demographic information in assessing the progress of development in their area of concentration. Moreover, the kinds of assessment made at the national and international levels prove to be impracticable methodologies for development practitioners, whose available resources often pale in comparison to that available to nationally-sponsored institutions.⁵⁰ A theoretical application of the human development index at the household level, proposed by researchers at the German Development Economics Conference in 2010, noted the excessive difficulties that a practitioner faces in conducting such an assessment both in terms of the complex task of assessing assets that are inherently difficult to quantify as well as the massive expenditure in time, money, and labor in order to carry out the assessment.⁵¹ Such an endeavor would provide incredibly detailed information about local communities, but its inherent complexity in its undertaking suggests that the local expertise of practitioners themselves is a more feasible tool in assessing development at the local level.

The third group of stakeholders, the individuals and communities of developing regions themselves, will likely not encounter the kinds of aggregate indicators that the development community employs. Their own livelihoods and experiences are the qualities that such measurements attempt to capture. Engaging the community in the identification of appropriate indicators poses additional challenges.⁵² I posit, then, that development indicators are not meaningful to this group so much as are the tangible changes in their own daily lives. Herein lies the greatest discrepancy between a development that is inclusive of local communities and individuals in the development process and those that are abstracted – it is difficult to ignore the immediate needs and the values of the

⁴⁹ Francis C. Okafor, "Measuring Rural Development in Nigeria: The Place of Social Indicators," *Social Indicators Research* 16, no. 1 (January 1, 1985): 69–76, doi:10.2307/27521270. Okafor's purpose is to convince practitioners of the potential utility of social indicators in rural Nigeria – in so doing, Okafor notes that the generation of appropriate measurements is stymied by the need to tailor this information to the local contexts, cultural customs, and social institutions of different regions and communities.

⁵⁰ Cecilia Wong, "Indicators at the Crossroads: Ideas, Methods and Applications," *The Town Planning Review* 74, no. 3 (July 1, 2003): 253–279, doi:10.2307/40112561. Wong notes that it is important that indicators are developed and applied with consistency in order to maximize retention in local policy institutions.

⁵¹ Kenneth Harttgen and Stephan Klasen, "A Household-Based Human Development Index," Proceedings of the German Development Economics Conference, Hannover 2010 (Göttingen: Verein für Socialpolitik, Ausschuss für Entwicklungsländer, 2010), <http://hdl.handle.net/10419/39994>.

⁵² Alan Terry, "Community Sustainable-Development Indicators: A Useful Participatory Technique or Another Dead End?," *Development in Practice* 18, no. 2 (April 1, 2008): 223–234, doi:10.2307/27751905. A community-led development initiative (conducted by a pre-existing community-based organization) in South Africa met with difficulties in corresponding with government bureaus to acquire data due to breakdown in communication channels.

marginalized when they are a fundamental component of the process. To be sure, measurement is a vital component of policy analysis, and makes large, beneficial projects possible. The danger of abstraction through measurement is the loss of the autonomy of individual voices, as the modern history of international development so starkly attests.

Participation and Challenging Development Thought

The rise of participatory methods of development has brought with it an overt emphasis on the inclusion of individuals and communities that were previously disenfranchised from the development process. On the local level, the adoption of participatory rural appraisal in the agricultural sector has offered a class of people previously treated as having little autonomy (subsistence farmers) a voice as a valued source in identifying and implementing development goals and solutions.⁵³ By virtue of the tools, techniques, and philosophy behind their approach, previously emphasized methods of development among the agricultural sector and international development more generally typically bypassed the role of the affected individuals and their communities in defining and implementing policy. These methods of development rely heavily on the aggregation and estimation of numerical data to evaluate and set the course of policy and make implicit assumptions about what is valuable to local stakeholders by conducting the process on their behalf. By contrast, participatory development represents a less abstracted means of conducting development, treating local stakeholders as both resources and members of the development team.

The contrasting philosophy between participatory and other methods of development is evidenced in the geographic site of the practice itself. Whereas development practices that exclude (or omit) the local agent often do not require a presence in the developing world and accordingly situate themselves well within the developed world, participatory approaches depend entirely upon the direct involvement of these local stakeholders. Consequently, NGOs and others that utilize participatory development practices more often locate themselves within the local environment itself. The geographic organization of major development institutions provides some insight into this systemic variation.⁵⁴ By and large, the offices of the major international institutions such as the United Nations, the World Bank, the International Monetary Fund, etc. are situated firmly within Europe and North

⁵³ Robert Chambers, "The Origins and Practice of Participatory Rural Appraisal," *World Development* 22, no. 7 (1994): 953-969, doi:10.1016/0305-750X(94)90141-4. Coming into its own in the 1990s, participatory rural appraisal refers to a set of principles that prioritize local ownership of development. A detailed list of common techniques is discussed at length in Chambers' article.

⁵⁴ Eric Neumayer, "The Determinants of Aid Allocation by Regional Multilateral Development Banks and United Nations Agencies," *International Studies Quarterly* 47, no. 1 (March 1, 2003): 101-122, doi:10.2307/3096078. Neumayer found that the role of geography played a differential role depending on the organization – organizations tended to favor countries with a longer colonial experience in the aid process while some U.N. agencies attempted to "counteract" this force by favoring countries which were more geographically distant from the U.S., Europe, or Japan (p. 120-21).

America.⁵⁵ While many of these groups have, over time, established regional branches and offices more closely located to the sites of development in which they involve themselves,⁵⁶ it is nevertheless true that the headquarters of the development workforce are major cities in the developed world, like New York, Geneva, Paris, or Stockholm, and not Cairo, Nairobi, or Mumbai.⁵⁷ Assuredly this is not a concerted effort to abstract the development community from the developing world. Rather, it is a result of inertia and convenience.

Consequently, while the intention to locate an organization in one place over another is almost certainly not an explicit attempt to exclude the developing countries from control in the development process (at least not in the post-colonial era), it is symptomatic of this status. Location is reflective of the type of methodology engaged in – “armchair” policy analysts work with aggregate data, statistical estimates that vary over time. Such methods are valuable, to be sure. The goal herein is to highlight the differences between this and the task faced by the local practitioner, who deals with a less neatly structured set of data. Participatory practice almost by definition includes a multiplicity of stakeholders who might be invested in different outcomes of the process.

Traditional approaches to development have not historically included the attitudes and opinions of the community in their analyses. Through the participatory framework, the voice of the community and its members assumes a central role not only in formulating solutions but in the process of formulating the initial problem and its constraints as well. This stands in contrast to practices that use aggregated information in the form of indicators and proxy metrics to identify areas of concern. Measurement is indeed a vital function and is behind much of the target metrics present in the U.N. Millennium Development Goals.⁵⁸ However, particularly at the local level, participatory approaches recognize that local communities are the experts of their own environment – in most cases the project to pursue is the one the community itself feels to be most important. Exactly what that project is

⁵⁵ Peter J. Boettke, Christopher J. Coyne, and Peter T. Leeson, “Institutional Stickiness and the New Development Economics,” *American Journal of Economics and Sociology* 67, no. 2 (April 1, 2008): 331–358, doi:10.2307/27739707. Boettke et al. introduce the framework of “stickiness” to describe the likelihood that a proposed development reform or institutional change will “take hold” in a locality. They describe foreign exogenous (FEX) institutions as the least sticky because the site of design and implementation is often separated by immense physical distance. I propose that the institutional impositions of major development policy institutions in Europe and North America fall into this category.

⁵⁶ As an example, the IMF now operates a series of Regional Technical Assistance Centers in many developing countries, most of which were established in the early 2000s with the goal of providing direct access to IMF representatives to assist developing countries in participating in the formation of poverty-reduction policy: International Monetary Fund, “Factsheet -- IMF Regional Technical Assistance Centers,” *International Monetary Fund*, September 2013, <http://www.imf.org/external/np/exr/facts/pdf/afritac.pdf>.

⁵⁷ Ambos and Birkinshaw (2010) offer the framework of attention as a scarce resource for headquarters engaging with subsidiaries. They found that subsidiaries with “high levels of strategic choice and attention perform better on all dimensions” that they observed. This study may have potential implications for the way headquarters of development institutions manage subsidiary branches in the developing world. Tina C. Ambos and Julian Birkinshaw, “Headquarters’ Attention and Its Effect on Subsidiary Performance,” *MIR: Management International Review* 50, no. 4 (January 1, 2010): 449–469, doi:10.2307/40985347.

⁵⁸ United Nations General Assembly, *United Nations Millenium Declaration* (United Nations, September 18, 2000), http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/55/2.

cannot be known without somehow incorporating the community in the process. Given the importance of the community in the participatory approach, a number of means have been implemented by which to include the community and organize their participation. Depending on local circumstances and available resources, participation might take the form of participatory planning and budgeting, individual interviews, transect walks, oral histories, etc.⁵⁹ Like the proposed development project itself, the method of community involvement must also be sensitive to the local context in which it will take place.

In theory, a community-wide development project strives to include as many members of the community as possible. A predominant emphasis among practitioners is the inclusion of women and the poor in this process to the maximum extent possible, as even in participatory approaches these groups are easily excluded from the process.⁶⁰ Generally speaking, the purpose of a community development project is not only to educate the community on pertinent issues related to development (water use, agricultural practice, etc.) but at the same time allow the community to jointly come to a consensus on a course of action. To the extent that they are able, every individual is encouraged to participate and provide their input on the project.⁶¹ In this way, every individual is made a participant in the development project. Doing so helps to provide a crucial sense of value, worth, and recognized autonomy to peoples affected by development projects. These means of information gathering are often more intensive and time consuming, but carry the added benefit of a more holistic and inclusive development process.⁶²

The empirically-informed policy approach has had a great influence on a number of global development issues. It comes as no surprise, then, that “success” for many in the development community is likewise adjudicated in terms of the results of such empirically-derived indicators. Much of the international community’s focus on development has entailed reaching the benchmarks set forth by the U.N. in the Millennium Development Goals, or improving rankings on other high-profile statistics, like the GDP, the Gini income inequality coefficient. Particularly for high-level policymakers, such benchmarks offer readily interpretable measures of how an area has changed over time with respect

⁵⁹ Chambers, “The Origins and Practice of Participatory Rural Appraisal.”

⁶⁰ Ganesh Chandra, “Participatory Rural Appraisal,” in *Issues and Tools for Social Science Research in Inland Fisheries*, vol. Central Inland Fisheries Research Institute (Barrackpore, Kolkata, India: Ed. P. K. Katiha, K. K. Vaas, A. P. Sharma, U. Bhaumik, & Ganesh Chandra, 2010), 286–302, http://works.bepress.com/ganesh_chandra/37. When done well, “Participatory approaches facilitate training and skill diffusion, and contribute to the socioeconomic development and strengthening of confidence of vulnerable groups such as poor women” (p. 2).

⁶¹ Bradley Walters B. et al., “Community History and Rural Development: Why Some Farmers Participate More Readily than Others,” *Agricultural Systems* 59, no. 2 (1999): 193–214, doi:10.1016/S0308-521X(99)00003-7. The authors provide a case study of subsistence farmers in the Philippines to illustrate the imperative to understand local historical contexts that explain differing inclination among villagers to participate in development project and devise development plans that appreciate the need for village-specific strategies.

⁶² Cornwall and Pratt, “The Use and Abuse of Participatory Rural Appraisal: Reflections from Practice.” It is important to note that the rhetoric of participation has been taken up by the development community at all levels, and has not always seen follow-up in action (Chambers, 1997). Cornwall and Pratt caution that superficiality in the application of PRA does little by way of empowering communities at all.

to its development; there exists also additional pressure among these policymakers (given that the "success" of the development agenda is judged by these indicators) to set policy based on its intended effect on the measures themselves as opposed to the circumstances surrounding the phenomena the measures are intended to reflect. Without an earnest commitment to participation, it is possible to neglect the needs, desires, or aspirations of the community in so doing.⁶³ Moreover, its inclusion confounds the readily interpretable measure of performance that indicators offer.

Particular tools and methodologies have arisen to meet the needs of practitioners in particular goals and circumstances. The incapability of macro-level empirical methodologies in policymaking to adequately address the needs of individual and local groups in the process has been met with the introduction of participatory tools which serve this purpose. One such tool is participatory action research, in which local communities actively identify problems within their community to address with the potential support of outside groups as co-researchers and co-collaborators. Rather than oppositional or defiant in orientation to one another, the two forms of development practice can, and necessarily should, serve complimentary roles in conducting a more ethical and comprehensive development program.

Incorporating participation into the development agenda, be it at the macro-level or the micro-level, reestablishes this autonomy, or at the very least makes strides in rectifying its absence. It does so by allowing the local communities to engage in the act of development for themselves instead of allowing others to carry out that process for them.⁶⁴ Whereas high-level development policy implicitly undermines the individual by virtue of the omission of the individual from the process,⁶⁵ the participatory approach emphasizes the pivotal role that local support and input play in creating efficacious and sustainable policy solutions. The act of recognition and inclusion is the defining characteristic of the establishment of equitable autonomy. Less time may be spent performing analyses of the situational context from third-party sources and more time may be spent meeting and engaging with individual community members to establish this knowledge. Participation extends beyond merely attributing a value to local skills and knowledge by recognizing the authority of local people in matters concerning their livelihoods.⁶⁶

⁶³ Sarah White and Jethro Pettit, "Participatory Methods and the Measurement of Well-Being," *Participatory Learning and Action* 50 (October 2004): 84–96. The authors note that "the scaled-up and mainstreamed practices of participatory research have not been particularly effective at (or even interested in) measuring or analysing things like exclusion or power. There has been a tendency to over-stress technical issues and under-recognise political dimensions of poverty and well-being" (p. 94).

⁶⁴ Robert Chambers, "The Origins and Practice of Participatory Rural Appraisal," *World Development* 22, no. 7 (1994): 953–69, doi:10.1016/0305-750X(94)90141-4.

⁶⁵ White and Pettit, "Participatory Methods and the Measurement of Well-Being."

⁶⁶ Amartya Sen, "Development as Freedom: An India Perspective," *Indian Journal of Industrial Relations* 42, no. 2 (October 1, 2006): 157–69, doi:10.2307/27768063. Sen's predominant emphasis on democratic process underscores an underlying characteristic that finds a corollary in local development practice. The implication behind Sen's argument is that through participation individuals are empowered to pursue change in a way that is untenable under most top-down approaches.

Participation in the development process reflects an attempt to establish a relationship of equal partnership,⁶⁷ not one governed by the dynamics of superiority and inferiority as characterizes the interactions between the developed and developing world through much of their recent history.⁶⁸ In practice, this is accomplished by affording local communities control over the direction and nature of the development agenda, or in the case of development research, fostering an “open dialog” that allows for the establishment of common goals.⁶⁹ The third means by which autonomy is vested in those most affected by development is accomplished by incorporating community members’ evaluation of the outcomes (read: the definition of well-being).⁷⁰ Just as macroeconomic indicators are used to determine the performance of high-level policies, local appraisals of the development initiative are a crucial yardstick in assessment when addressing the needs of these groups is the primary objective. In this way, by recognizing the autonomy of the developing world, participatory development accomplishes the dual feat of establishing a precedent of inclusion and better addressing the nuanced, context-sensitive needs of particular localities.⁷¹

Scaling up practice, scaling down policy

While particular techniques of development may be difficult to transfer between high-level policy-based practices and locally-based initiatives, there is much room for the philosophical groundwork of these two modes to come together in terms of their perspective on development. The theoretical framework underlying the participatory approach is applicable to both macro-level and micro-level activities. Accordingly, it has the power to unify international development thought between local practice and international policy in a way that until recently has been unknown among the development community. The last two decades have reflected the fruits of this new means of development.

“Participation,” in the freest sense of the term, does not imply any particular structure to the form in which it takes place. The primary requirement to establish legitimate participation is that the agent is able to act fully upon their own behalf. As such, the means of participation are compatible not only with the type of practice conducted at the local level but also with the development process

⁶⁷ Robert Chambers, “Participatory Rural Appraisal (PRA): Challenges, Potentials and Paradigm,” *World Development* 22, no. 10 (1994): 1437–54, doi:10.1016/0305-750X(94)90030-2. Chambers recognizes that participatory methods have great potential to empower individuals, but there remains the danger that only certain groups see the benefit: men over women, the better off over the worse off, the local elite over the poor, etc. (p. 1444–45).

⁶⁸ Cornwall and Pratt, “The Use and Abuse of Participatory Rural Appraisal: Reflections from Practice.” Much of the widespread criticism that Cornwall and Pratt note about PRA stems from the fact that its emphasis on particular methods and techniques does not do enough to combat the challenges of “representation and voice in new arenas for ‘civil society’ and citizen participation” (p. 19) that are common to both macro-level and local development.

⁶⁹ White and Pettit, “Participatory Methods and the Measurement of Well-Being,” 93.

⁷⁰ Ibid.

⁷¹ Walters et al., “Community History and Rural Development: Why Some Farmers Participate More Readily than Others.”

as it exists at the national and international levels. Organizations at such a large scope are often tasked with representing many hundreds of thousands or millions of people (governments, etc.). It would indeed be somewhat naïve to suggest that a “town-hall” or interview format consisting of each individual agent is practicable at this scope.⁷² The method of participation at the macro-level is representative democracy. Representatives of developing nations who are elected democratically can be said to legitimately reflect the interests of their constituencies on the world stage, and subsequently satisfy some measure of participation in formulating national and international development policy.⁷³

The developed world can do much to improve formal relations with the developing countries by offering greater voice and authority according to a model of participation akin to that used in local development practice. “Nominal” participation is simply insufficient to foster an efficacious development agenda, and represents a large component of the criticism directed toward the application of participatory methods both in local practice and in attempts to “scale-up” particular techniques and methodologies.⁷⁴ This might be contrasted with some contemporary conventions and conferences that have sought to rectify the imbalance by explicitly allowing developing nations to set the political agenda.⁷⁵ Such willingness to cede authority over the process of development is highly beneficial in terms of assuring that the voices of local peoples are adequately represented.

A greater level of unity in theory behind local and international development has arisen in tandem with increasing levels of participation of developing countries in macro-level policy formation. It remains true that methods intrinsic to one scale of development are not necessarily applicable to the other. The collection of data to construct a household-level human development index is just as infeasible as would be conducting comprehensive oral histories with every resident of a developing region to be included in a policy briefing. The difficulties of measurement in some local environments (cost, time, etc.), coupled with the relatively small amount one stands to gain from small sample sizes makes comprehensive empirical methodologies impracticable at the local scale, if not ill-advised. A similar argument of course must be made for scaling-up comprehensive participatory

⁷² Andrea Cornwall, “Introduction: New Democratic Spaces? The Politics and Dynamics of Institutionalised Participation,” *IDS Bulletin* 35, no. 2 (April 2004): 1–10, doi:10.1111/j.1759-5436.2004.tb00115.x. Cornwall notes that the great experiment of contemporary development practice has been the introduction of democratic-style institutions to represent the voice of previously unrepresented peoples in decision-making. For Cornwall, the mixed record of these institutions underscore the continuing challenges in uniting development thought with practice.

⁷³ Sen, “Development as Freedom: An India Perspective.”

⁷⁴ Cornwall and Pratt, “The Use and Abuse of Participatory Rural Appraisal: Reflections from Practice.”

⁷⁵ The most recent iterations of the Tokyo International Conference on African Development (specifically TICAD IV and TICAD V) have been emblematic of this effort. These conferences allow leaders of African nations to establish a set of development objectives and enter into negotiations with the Government of Japan to secure funding and support for these projects. This stands in contrast to systems in place at the Bretton Woods institutions, whereby borrowing countries must fulfill a set of policy criteria to receive funding. Ministry of Foreign Affairs of Japan, “What Is TICAD” (Ministry of Foreign Affairs of Japan, n.d.), <http://www.mofa.go.jp/region/africa/ticad/what.html>.

techniques at the international level. At the national levels, introducing participatory methods designed for village-level development projects can introduce new challenges and barriers to participation.⁷⁶ Community members face costs in the form of the time that participatory methods require as the scale of the process increases. Each has a home, a family, and/or a livelihood that depends on them for support. The state must necessarily rely on aggregation in setting its development policies. On the other hand, philosophy and theoretical foundations of the methodologies employed are easily scalable. The philosophy one adopts in the development process manifests itself in terms of where values are placed, who is vested with decision-making authority, and whose interests are truly represented in a particular course of action.⁷⁷ Participation offers a framework by which the whole of the development community – policymakers and local practitioners alike – can orient themselves around individuals and communities as the fundamental stakeholders in international development. As such, the incorporation of participation is a chance to unify the practice of development under a set of values that is equitable to traditionally unrepresented groups.

Inequalities in the participatory framework

Despite the importance of a human-centered focus in development, there remain significant challenges when implementing a participatory framework, some of which are brought upon by that framework itself. Broadly, these issues include barriers imposed by social and cultural factors, difficulties in increasing the participation of women, and the problem of introducing new inequalities into communities as the result of one's efforts.

Social and cultural factors permeate the local development context and pose unique challenges to practitioners in each of the localities in which they operate. For practitioners seeking to emphasize local participation in the decision-making process, social variables, like the amount of time and wealth available to individuals in the community, disproportionately allows some to participate more than others.⁷⁸ Especially for those engaged in subsistence farming as their livelihood, time is a precious asset the majority of which must be spent performing labor intensive agricultural activities. Spending large portions of a morning or afternoon engaged in community development thus affects the short-term ability of the subsistence farmer to sustain themselves and their families. On the other hand, those engaged in other occupations or who are otherwise not involved in such labor-

⁷⁶ Cevat Tosun, "Limits to Community Participation in the Tourism Development Process in Developing Countries," *Tourism Management* 21, no. 6 (December 2000): 613–33, doi:10.1016/S0261-5177(00)00009-1. Tosun recognizes a widely-held belief within the development community (especially on the part of Western practitioners) that participation of host communities is essential in the tourism development process. However, Tosun claims that structural, organizational and cultural barriers, like traditional bureaucracies and distributions of power, inadequate management and resources, and the hegemonic influence of local elite, make community-led tourism development a difficult endeavor.

⁷⁷ Paul, "Community Participation in Development Projects."

⁷⁸ Ibid. Paul notes that the "short term opportunity cost" for those in poor communities is substantial (p. 11).

intensive work are better able to devote time to such community projects and thereby represent a greater proportion of the participation the practitioner is able to elicit. Likewise, wealth constitutes another resource in which those with more available are differentially represented in participatory development practices.⁷⁹ For instance, those with greater levels of income or available assets in the community need not devote the entirety of their time to insuring their livelihoods. As one can see, time and money are intimately linked – one must be cognizant of their influence on participation and devise methods of addressing it. Strategies might include personal interviews with individuals unable to attend development meetings,⁸⁰ or administering a verbal questionnaire to discern community attitudes.⁸¹

In addition to social factors, the cultural values held in various localities can impact the degree to which certain individuals participate in the development process. In many communities, local elders, those of high caste, or those who hold special positions within the community are all potential groups who might exercise (or be expected to exercise) a greater level of influence in community decision-making that is disproportionate to their number. The development practitioner who is cognizant of this concern can devise some means of cooperation with such visible figures or determine some other method of eliciting the opinions of other members of the community. This becomes of particular importance in situations where individuals may fear stigmatization or reprisals from others for voicing their thoughts in a group setting. By that same token, members of low social status are likely to be excluded (overtly or implicitly) from the participatory framework. This situation may arise due to beliefs among the community about the value of certain members, or due to the fact that such individuals may believe themselves that they should not participate.

One of the largest such systematically excluded groups in local communities is women. While the particular social role assigned to women varies by culture and place, it is true that in many social systems women occupy a differential position that excludes them from certain forms of community participation. In some instances, this manifests itself in a refusal on the part of male community members to allow women to participate in the decision-making process; in others, women may participate but find their opinions discounted by their counterparts. Some proposed solutions to this problem call for gatherings that are exclusive to women in the community in order to provide them with a

⁷⁹ Atiur Rahman and Abdur Razzaque, "On Reaching the Hardcore Poor: Some Evidence on Social Exclusion in NGO Programmes," *The Bangladesh Development Studies* 26, no. 1 (March 1, 2000): 1–35, doi:10.2307/40795591. This study found that the hardcore poor were systematically excluded from the social intervention programs run by NGOs in Bangladesh, in part due to the linkage to credit programs also run by the NGOs. One should note that 'wealth' is highly relative – in this case the hardcore poor versus the moderately poor.

⁸⁰ Chambers, "The Origins and Practice of Participatory Rural Appraisal."

⁸¹ White and Pettit, "Participatory Methods and the Measurement of Well-Being." White and Pettit note that participatory methods can also be used to help determine criteria for use in designing more effective surveys (p. 94).

socially permissible outlet in which to participate. Even in this context, however, one must be cognizant of the fact that the same sort of social and cultural factors affect the level of participation of certain members over others in this group setting as well. Women of higher social prestige or wealth may command greater respect from other women than do their peers, which in turn may encourage some women and discourage others to speak out. Again, to operate an equitable participatory framework one must be able to identify these potential sociocultural barriers and develop contextually appropriate remedies to mitigate their effects.

Development projects implemented via participatory methods, just like all forms of projects, run the risk of introducing new inequalities to communities as a result of the decisions made during the process about how and who is to receive assistance. Certain development projects may only impact a single section of the community by virtue of their nature – for example, agricultural development programs for subsistence farmers most directly benefit those with land to farm, while doing little to provide for the landless in the community. To the best extent possible, it is imperative to consider the impact on the whole of the community when designing and implementing development projects – the value of the participatory framework lies in its ability to extend the voices of the individual who was previously unrepresented in the development community as a whole. The challenge, then, is to further extend that voice regardless of its station or position.

Conclusion

Participation has at times been controversial in the recent history of international development. For much of this history, “development” was a craft left to the purview of Western practitioners and researchers, who were predominantly focused on furthering the study of economic growth as the primary vehicle of development. Imperial legacies unfortunately detract from the many positive gains made by Western organizations in international development. Participation, not as a particular technique or methodology but as a means of thinking about and practicing development, offers recourse from this legacy by acting both as a symbolic challenge to the dominance of the West and as an extension of autonomy to traditionally excluded groups of people. In this manner, participation offers to make compatible the approach to development at both the level of local practice and international policy.

That being said, it is true that “participation” as a concept is not without its own problematic legacy. Since the 1980s the development community has seen the dramatic proliferation of “participatory” as a buzzword in scholarly, public, and non-profit circles, but that trend has not necessarily translated into an equally dramatic reversal in the fortunes or the roles of underrepresented groups

in the development process. To a certain extent, it seems that development is concerned more with image than with action:

The overall result is that since the 1970s in many ways, community participation has become an umbrella term for a supposedly new genre of development intervention. Not surprisingly, to propose a development strategy that is not participatory is now almost reactionary.⁸²

The participatory approach contends with issues in social inequities that manifest themselves on the community platform. In cases where local culture assigns high prestige to chiefs, elders, or other leadership figures, these individuals command a great deal of respect from the community and accordingly their voice carries an outsize level of influence in the meeting space. Likewise, in gatherings of women conducted for improving women's participation in labor roles, some local contexts may place a disproportionate level of influence on those women with higher social prestige in the community. The following chapter concentrates on these challenges in implementing a participatory approach across scales of development by focusing specifically on a single case study of how the design of interventions with regard to the implementation of biogas programs in rural India can differentially benefit those within village communities and thereby introduce new inequities in terms of participation.

⁸² Tosun, "Limits to Community Participation in the Tourism Development Process in Developing Countries."

Chapter II: Biogas Technology and Rural Development

Biogas is a technology with tremendous potential to alleviate many of the difficult aspects of daily life that contribute to low quality of wellbeing. In so doing, biogas technology affords those in rural areas a greater opportunity to improve their livelihoods and reduce the discrepancy in living standards with their urban counterparts. This is accomplished predominantly in the realms of health and productivity, noting especially that women stand to gain the greatest as a result of improvements in these areas. As such, the use of biogas in development contexts provides an opportunity to explore the complexities of participation at the local and regional levels by focusing particularly on a single technology used in development interventions.

A Brief Introduction to Biogas

Biogas is a clean-burning fuel that is used for both industrial and domestic applications. Current biogas operation worldwide generally takes the form of either large-scale industrial biogas plants or on a much smaller scale as individually or community-owned biogas units. Biogas consists of a mixture of methane and carbon dioxide produced as a byproduct of bacteria breaking down the organic compounds found in plant and animal matter via the process of anaerobic digestion. Agricultural waste, such as fibrous plant matter and livestock manure, is the primary “fuel” used in most biogas plants in operation today. The remaining fibrous material following digestion is turned into a slurry that can then be used in agriculture. Advocates of the use of biogas as an alternative means of energy production point to research that underscores the viability of this method as a means of mitigating the effects of climate change due to its nature as a comparably clean alternative to existing fossil fuels.⁸³ Industrial scale applications of biogas technology have begun demonstrate the feasibility of including bioenergy sources into existing electrical grids in the developed world. Alternatively, rural development practitioners have increasingly turned toward the installation of small-scale biogas plants for villages and individual households as a means of providing electricity or heat for cooking to regions that have been traditionally excluded from the power grid.⁸⁴ Practitioners and researchers alike have noted the potential viability of biogas as a means of increasing the quality of life in areas dominated by traditional methods of subsistence farming. Notable exploratory studies and implementation projects have been carried out in rural regions of Nepal, India, and China.

⁸³ Siri Pugsgaard et al., “Biogas in Organic Agriculture—effects on Productivity, Energy Self-Sufficiency and Greenhouse Gas Emissions,” *Renewable Agriculture and Food Systems*, January 24, 2013, 1–14, doi:10.1017/S1742170512000440. The author notes that biogas is an effective method of reducing greenhouse gas emissions from agriculture, and is used widely in Western Europe.

⁸⁴ Karthik Rajendran, Solmaz Aslanzadeh, and Mohammad J. Taherzadeh, “Household Biogas Digesters—A Review,” *Energies* 5, no. 12 (August 8, 2012): 2911–42, doi:10.3390/en5082911.

Sites of industrial application are predominantly clustered in the developed world, with a particularly sizable presence in Germany. That being said, industrial biogas plants are also present in rapidly developing nations, notably India and China. There are currently 86 active, 3 in the process of financing and permitting, 3 under construction, and 5 announced biogas plants in India. Active biogas plants represent a total installed capacity of 140.02MWe. Following the completion of all plants announced and under construction, the total installed capacity of biogas in India will reach 209.37Mwe.⁸⁵ Within the rural state of Maharashtra, India, a total of 13 active and announced biogas power plants will produce a combined 25.7MWe of energy.⁸⁶ Generally speaking, industrial scale biogas plants are intended for the production of electricity and are consequently used to supply power to regional power grids. These plants are typically owned and managed by private utility corporations, state-owned utilities, or state-sponsored (public-private) entities. While such plants are a valuable addition to the global energy portfolio in terms of their status as a relatively clean and affordable power source, the massive scale at which they operate and tether to existing power networks prevents industrial biogas plants from providing much effective support to rural communities that are far removed from existing power networks. As an alternative, rural development practitioners have turned to "household" biogas plants to provide a source of fuel or electricity for families that are off of the grid and can supply the plant with the requisite quantity of biological matter. Small-scale installations such as these necessarily differ from their industrial counterparts both in their requisite inputs and their relationship to end-users. In the case of household use, the plant is installed nearby the living environment where it is fed agricultural waste from family-owned livestock. The plant converts this waste into fuel that can then be used for cooking or in an electrical generator to supply the home with a limited amount of electricity. Community-based biogas plants are larger than their household counterparts, and are intended to service the entirety of a village or rural community. Some practitioners have noted that community-owned or operated biogas plants result in greater issues in management and maintenance than do household biogas plants. There is considerable debate among researchers and practitioners as to whether individual or community-based biogas plants are more practical and efficient in providing energy to rural communities. Some argue that household biogas plants only serve to further the inequities between the (comparatively) rich and poor in rural communities, as the rich are disproportionately able to adopt the technology, be it through income or greater suitability of agricultural and livestock holdings. Community-based plants

⁸⁵ GlobalData Corporation, "Alternative Energy eTrack," Database, *GlobalData*, accessed January 16, 2014, www.alternativeenergyetrack.com/BiogasPlants.aspx.

⁸⁶ Ibid.

are superior in that such inequality does not hinder one's ability to benefit from the technology; even the "landless poor" witness an increase in benefit from a community-based plant.⁸⁷

Household biogas plants carry an additional set of obstacles. The typical plant requires at least three healthy cows in order to produce enough fuel to meet requirements for domestic use.⁸⁸ Subsistence farmers with extenuating circumstances (sick livestock, or no livestock at all) may find it difficult to recoup their investment in a household biogas plant. This may end up exacerbating the financial hardship that development practitioners sought to alleviate by increasing the burden of indebtedness that subsistence farmers often face. This is of particular issue in the Vidarbha region of central India, where a massive increase in suicides among destitute farmers in the last two decades has raised concerns among government officials and activists about the health and sustainability of the region and its people.⁸⁹ With regards to financing, while biogas plants are much more accessible than "conventional" means of energy generation in the developed world, they are not without cost. Most biogas implementation schemes in use in the developing world require substantial financial grants and subsidies from government agencies and non-profit development organizations. In some cases, the remaining cost of a biogas plant can be honored if the household provides labor during the installation.⁹⁰ Various types of household biogas plants are in use in developing regions, with models generally employing materials and labor from the regions in which they will be used. While the function remains largely the same, biogas plants used in rural China differ slightly from those used in rural India.⁹¹

In India, approximately four million household biogas plants are currently installed in the country's rural areas.⁹² The promotion and implementation of biogas in rural communities is a cause that the Government of India has taken up enthusiastically, maintaining a bureau (title) with the exclusive task of furthering this cause. The Indian government is also the largest provider of subsidy and grant assistance to rural households that wish to install biogas plants.⁹³ As a component of a

⁸⁷ DC Stuckey, "Social, Economic, and Technical Considerations of Biogas Implementation in the Third World," *Biomethane, Production and Uses*, 1980, 16–28.

⁸⁸ Programme Evaluation Organisation Planning Commission, *Evaluation Study on National Project on Biogas Development* (New Delhi: Government of India, May 2002). This nationwide study found that the average number of cattle owned by biogas plant owners was 5.23.

⁸⁹ The Indian Government has set up a mission, the Vasantrao Naik Sheti Swavlamban, in Amravati tasked specifically with addressing the crisis of farmer suicides: <http://www.vnss-mission.gov.in/>

⁹⁰ Kamalnayan Jamnalal Bajaj Foundation, *Kamalnayan Jamnalal Bajaj Foundation Annual Report 2012-2013* (Maharashtra, India: Kamalnayan Jamnalal Bajaj Foundation, 2013), www.bajajfoundation.org.

⁹¹ S. Rubab and T. C. Kandpal, "Energetics of Household Biogas Plants in India," *International Journal of Ambient Energy* 16, no. 1 (January 1995): 49–53, doi:10.1080/01430750.1995.9675666. See this study for more information on the three dominant types of biogas plants most widely used in India.

⁹² Tom Bond and Michael R. Templeton, "History and Future of Domestic Biogas Plants in the Developing World," *Energy for Sustainable Development* 15, no. 4 (diciembre 2011): 347–54, doi:10.1016/j.esd.2011.09.003.

⁹³ Huang Liming, "Financing Rural Renewable Energy: A Comparison between China and India," *Renewable and Sustainable Energy Reviews* 13, no. 5 (June 2009): 1096–1103, doi:10.1016/j.rser.2008.03.002. The Indian government has established an office dedicated to the financing of renewable energy solutions in rural areas/ The government is heavily involved in energy development for its rural population.

development plan, "off-grid" energy solutions like household biogas offer developing states like India a comparatively low cost means of access to critical energy needs without massive infrastructure expenditures in remote communities. Whereas conventional infrastructure, i.e. an electrical power network with a large industrial power plant and "grid" by which villages are supplied electricity, requires a massive upfront investment of capital and resources, the "ad-hoc" nature of household biogas allows for a much more rapid and sensitive response to energy demand in rural areas while also mitigating some of the financial risk of a large public works project. One might make a valid comparison between the implementation of household biogas and the use of small-scale solar power generators in Africa and other developing areas.⁹⁴ Advocates of both practices hail the methods for "skipping" the traditional process of industrialization in their approach to development. These areas effectively bypass polluting energy production processes and thereby reap increased benefits from their greater reliance on cleaner renewable technologies. In the case of household biogas, one might also note the potential added benefit of allowing individuals a greater degree of autonomy and participation in identifying, developing, and attaining an energy solution that meets their needs. Additionally, both domestic and international non-government organizations are actively involved in the promotion and facilitation of biogas implementation in rural India. These organizations act on a much more local level than does the national government or research and policymaking institutions. Common tasks undertaken by these NGOs include promotion and education about biogas as an energy source, assistance in applying for government grants and subsidies, and support in the construction of the biogas plants. Often, development practitioners perform these tasks in addition to other, typically complimentary development goals, such as sustainable farming practices, irrigation and water use, education, and women's health.

The maximum potential capacity for biogas as a fuel source is a matter of great theoretical interest for scholars working on problems in both the developed and developing countries. Researchers from the University of Texas present a hypothetical case in which animal manure in the United States is used for the production of biogas. Though theoretical, the calculations undertaken in this study suggest that in the United States roughly 95 million animals can produce approximately 1% of total energy consumption. The study goes on to estimate the effect that converting livestock manure,

⁹⁴ Simon Willans, Amé Christiansen, and Paul Munro, "Emerging Forms of Entrepreneurship: For-Profit and Non-Profit Partnerships for the Dissemination of Solar Power into Rural Sub-Saharan Africa" (presented at the 56th Annual ICSB World Conference, Sweden, 2011), http://www.researchgate.net/publication/256091101_Emerging_Forms_of_Entrepreneurship_For-Profit_and_Not-For-Profit_Partnerships_for_the_Dissemination_of_Solar_Power_into_Rural_Sub-Saharan_Africa/file/72e7e521a9645ba07a.pdf. Provides an overview of the concrete steps development practitioners are taking to bypass the constraints of traditional energy infrastructure development in Africa.

which is currently left in open pits to decompose, on greenhouse gas emissions.⁹⁵ The estimated energy contribution and reduction in greenhouse gases that this study provides is a useful reference for the type of estimations required to tackle the problem of biogas implementation in developing countries like India or China.

Likewise, scholars have focused a great deal of attention on the current state of industrial scale biogas technology, with a particular focus on applications for use in the electrical grid or as an alternative fuel source. A survey article published by German researcher Peter Weiland describes in some depth the types of chemical processes by which biogas production can occur, and the efficiency of varying input sources. As a whole, the article serves as an introductory primer into biogas research and the future directions in the field.⁹⁶ The brief description of industrial-scale biogas operations presented here draws on the explanations presented in Weiland's review. This review locates biogas initially within the context of global climate change and the continued scarcity of fossil fuel resources. In light of the uncertainty inherent in these two concerns, the article proposes that applications for biogas research are timely and critical moving into the future. Additionally, existing research indicates that the process of anaerobic digestion underlying biogas is particularly well suited among available bioenergy technology to address these concerns, in that it is exceptionally efficient and environmentally friendly.⁹⁷

At the most general level, biogas is produced via the breakdown of complex organic polymers – proteins, sugars, and fats – and their reorganization into methane and carbon dioxide ($\text{CH}_4 + \text{CO}_2$).⁹⁸ According to Weiland, most organic matter is suitable for anaerobic digestion, with the exception of wood or other densely lignified substances. Most biogas plants utilize livestock manure from chickens, cows, or pigs. The biogas yield is dependent on the composition of fats, sugars, and proteins in the manure. Broadly speaking, biogas operations occur as either wet or dry fermentation. The distinction refers to the percentage of solids in the fermenter. Wet fermentation, which comprises 90% of industrial scale biogas plants, typically consists of less than 10% solid content.⁹⁹ Industrially produced biogas can result in an electrical efficiency of up to 43% and can be used in engines to generate both heat and power through a variety of methods. Weiland notes that nitrogen

⁹⁵ Amanda D Cuéllar and Michael E Webber, "Cow Power: The Energy and Emissions Benefits of Converting Manure to Biogas," *Environmental Research Letters* 3, no. 3 (July 2008): 034002, doi:10.1088/1748-9326/3/3/034002.

⁹⁶ Peter Weiland, "Biogas Production: Current State and Perspectives," *Applied Microbiology and Biotechnology* 85 (2010): 849–60.

⁹⁷ Ibid.

⁹⁸ For an analysis of the chemical process in much greater depth, the explanation that Weiland (2010) provides is a thorough primer.

⁹⁹ For further description of the suitable components and technical specifications of these systems, see Weiland (2010).

byproduct from the biogas production process can be used as an effective fertilizer in agricultural applications.¹⁰⁰

The review of industrial biogas provided by Weiland is generally limited in scope to the developed world, by virtue of the fact that most industrialized applications have been conducted there. Research conducted in the developing world regarding the state of biogas has likewise been conducted. Gautam et al. present a case study of the biogas sector in Nepal, as an exemplum of the potential for biogas to contribute to furthering sustainable rural development. The article discusses the current state of biogas in Nepal, with particular attention to the promotion of rural livelihoods due to its cost efficiency and utilization of agricultural waste.¹⁰¹ The population of Nepal is roughly 86% rural, according to figures cited by the researchers, most of whom engage predominantly in subsistence agriculture. The article indicates that the majority (88%) of fuel sources for the country are 'traditionally' acquired – firewood, cattle dung, agricultural byproduct, etc. Although it must be said that climate and agricultural context vary enormously across the subcontinent, the researchers suggest that the circumstances surrounding the development of the biogas sector in Nepal was influenced by the development of biogas in India. This influence, according to the researchers, is due in part to geographic and socioeconomic similarities between the two countries, in addition to similar circumstances related to government and nonprofit financial assistance. In both the Indian and Nepali cases, biogas proved itself particularly well suited to the condition of rural communities, which are characterized by difficulty in acquiring or sustaining traditional fuel sources or fossil fuels, abundant supply of agricultural waste, among other factors.¹⁰²

Similar to other market sizing analyses, Gautam et al. begin with the estimated cattle population of Nepal in determining a reasonable estimate for biogas plant capacity. Biogas potential is substantially under-realized. Among factors that the researchers discuss, of further interest may be complications in remote geography and the influx of mosquitos due to biogas plants in residences. Gautam et al. admonish researchers to be wary of these challenges in future biogas applications.¹⁰³

Importance of Biogas in Rural Development

One of the most direct improvements to quality of life is realized in terms of health and sanitation. By transitioning to biogas technology for use in indoor cooking and heating, households ben-

¹⁰⁰ The byproduct of household biogas digesters, known as "slurry," is similarly used as a form of fertilizer by subsistence farmers. The importance of this application will be mentioned later in this chapter.

¹⁰¹ Rajeeb Gautam, Sumit Baral, and Sunil Herat, "Biogas as a Sustainable Energy Source in Nepal: Present Status and Future Challenges," *Renewable and Sustainable Energy Reviews* 13, no. 1 (January 2009): 248–52, doi:10.1016/j.rser.2007.07.006.

¹⁰² Ibid.

¹⁰³ Ibid.

efit from both a reduction in chronic illnesses from smoke exposure as well as an overall improvement in sanitation of the surrounding living environment. Researchers assessing the health impact of biogas in India documented that a significant number of cases of respiratory illnesses in rural areas resulted from the use of traditional solid fuels for cooking in poorly ventilated indoor spaces. Such health risks are a major concern for those in rural communities because they pose a serious threat to the quality and longevity of one's life. By transitioning to biogas as an alternative fuel source, this threat is drastically reduced. Immediate as well as long-term improvements to the standard of living within the household are thus made possible through the use of biogas. Similarly, research conducted in Nepal found that switching to biogas as opposed to high smoke-producing fuels resulted in a lower incidence of cataract formation among women who cook indoors. Of particular concern is the ecological and health impacts of these fuel sources. Gautam et al. note that households in Nepal face respiratory problems from the use of cattle dung in indoor cooking stoves and other ailments related to the gathering of firewood from increasingly receding forests.¹⁰⁴ In discussing positive benefits from biogas, the researchers cite reduced indoor-smoke exposure (and corollary ailments), increased human hygiene, and education, employment, and gender benefits.¹⁰⁵

Often times debilitating to one's vision and costly to rectify, cataracts are an additional threat to quality of life that are particularly common in rural settings. Lowering the incidence of cataracts in these areas, then, is an important step in addressing conditions that prevent rural communities and individuals from achieving drastic improvements in their lives. While biogas certainly cannot correct existing cataracts in the population, transitioning to clean-burning fuels is critical in combating the prevalence of the condition.¹⁰⁶ The reduction of chronic respiratory illness and incidence of cataracts is indicative of the means by which biogas improves health in rural households. Namely, it removes one of the greatest causal factors (smoke-producing fuels in poorly ventilated spaces) of these conditions whilst not sacrificing any of the functionality of the technologies it replaces.¹⁰⁷ The ability to continue performing these tasks (cooking, heating, etc.) is critical for maintaining the household and thereby are essential elements in ensuring that development interventions in this area, like biogas, maintain adequate retention.

Biogas furthermore makes critical gains with respect to living environment and sanitation. Because both agricultural and human waste can be used in order to fuel biogas digesters, waste no

¹⁰⁴ Ibid.

¹⁰⁵ See Gautam et al. for an overview of environmental and economic benefits.

¹⁰⁶ Amod K Pokhrel et al., "Case-control Study of Indoor Cooking Smoke Exposure and Cataract in Nepal and India," *International Journal of Epidemiology* 34, no. 3 (June 1, 2005): 702-8, doi:10.1093/ije/dyi015.

¹⁰⁷ Ibid.

longer needs to lie untreated in fields or other areas of the living environment.¹⁰⁸ Untreated waste is a critical issue due to the tendency toward increased risk of infectious diseases when individuals come into repeated exposure. Biogas digesters offer the opportunity to use this byproduct not only in the production of fuel, but also in creating a slurry (the byproduct of the anaerobic digestion process that can be applied to fields as manure.¹⁰⁹ This slurry may be applied to agricultural land as a form of fertilizer¹¹⁰ without having to resort to purchasing costly fertilizer mixtures with one's income.¹¹¹ Combined with other development technologies targeted toward sanitation, biogas is an effective means of improving the overall living conditions of the household.

Another major aspect of rural life in which biogas affords critical benefits is in the realm of productivity. Conventionally, solid-fuels are used in indoor stoves for cooking and heating. The availability of these fuels, while not always in a state of scarcity, often require lengthy travel away from immediate surroundings for their procurement. Researchers Christiaensen and Heltberg have noted that this travel time, on the order of several kilometers, takes out a substantial portion of one's day. On average, fuel procurement requires 1.2 hours – time which could be used for a number of more beneficial activities.¹¹² Of these, new possibilities for income generation and leisure are most notable in terms of the impact on wellbeing. Particularly for those engaged in subsistence farming, most of the household members' time is spent engaging in either agricultural labor or completing domestic tasks. Little time is made available for activities outside of these two capacities. Consequently, labor-reducing technologies such as biogas allow additional time to be devoted to activities that would have been impossible given the constraints of subsistence farming. When these additional activities are related to income generation, rural households are able to make a substantive improvement in their standard of living by increasing their available financial resources. Some examples of income generating activities include raising additional livestock to bring to market or produce dairy products, traditional and artisanal craft making, etc. In some cases, "substantive improvement" might entail the reduction or elimination of debt. A substantial proportion of subsistence farmers in central India face

¹⁰⁸ Yu Chen et al., "Household Biogas Use in Rural China: A Study of Opportunities and Constraints," *Renewable and Sustainable Energy Reviews* 14, no. 1 (2010): 545–49. Much of the research discussed thus far makes reference to the sanitary benefits of biogas. Chen et al. addressed the problem of sanitation directly by proposing the use of "eco-agricultural" models that further improve sanitation by connecting toilets and other amenities to the digester. Chen et al. argue that this provides multiple sanitary benefits that offer extended value for poor communities.

¹⁰⁹ K. Jatinder Singh and Sarbjit Singh Sooch, "Comparative Study of Economics of Different Models of Family Size Biogas Plants for State of Punjab, India," *Energy Conversion and Management* 45, no. 9–10 (June 2004): 1329–41, doi:10.1016/j.enconman.2003.09.018.

¹¹⁰ Luc Christiaensen and Rasmus Heltberg, "Greening China's Rural Energy: New Insights on the Potential of Smallholder Biogas," *Environment and Development Economics*, August 1, 2013, 1–22, doi:10.1017/S1355770X13000375. Researchers noted that, in their study in rural China, 77% of their sample households used slurry for this purpose.

¹¹¹ W. G. Ding, Y. Wu, and Q. Li, "Cost Effectiveness Analysis of Household Biogas Plants in China," *Energy Sources, Part B: Economics, Planning, and Policy* 8, no. 4 (May 22, 2013): 431–38, doi:10.1080/15567249.2011.574187. Ding et al. found that household biogas digesters in rural China reduced expenditures on fertilizer by a "large cut" of the household's income, with the additional benefit of improved air quality and sanitation.

¹¹² Christiaensen and Heltberg, "Greening China's Rural Energy."

crippling amounts of debt while at the same time struggling to eke out a living from their farmland. As a result, suicides have become a prominent occurrence in the region as farmers begin to feel that they are no longer capable of continuing under such circumstances and have little remaining alternatives.¹¹³ Reducing the time constraints of labor for the household allows the potential for some measure of respite from this scenario. In other cases, the extra time freed through biogas allows households to invest in resources that will provide additional returns for their wellbeing. Additional livestock might produce additional dairy products and manure that can be used within the household or brought to market. Similarly, farmers may choose to reinvest in additional agricultural products or use this funding for additional time-saving aids or other amenities. Biogas thus represents not only an immediate improvement in living conditions but also a path down which increasing returns in quality of life are realized through the opening of new opportunities for change and intervention.

Alternatively, this time can be used in the pursuit of leisure. What many might consider “free time” is also a scarcity among subsistence farmers, particularly during difficult economic times and poor growing seasons. Reducing the required amount of time spent on domestic activities, then, permits the ability to spend less time securing one’s livelihood and more on other forms of fulfillment. In rural China, researchers Christiaensen and Heltberg noted that roughly 25% of biogas recipients engaged in leisure activities with their extra time. A full 75% spent this time on income-generation or additional domestic tasks.¹¹⁴

It is critical to note that the benefits of biogas are likely to substantially improve the quality of life for women especially. Women are traditionally underrepresented in development and often occupy highly vulnerable or marginalized positions in society. As such, much focus has been placed as of late on targeting interventions toward improving the lives of women in rural communities. Biogas accomplishes this objective, at least in part, due to the fact that the aspects of household life that are improved through biogas are more often composed of women. Several of the research studies on health improvement through biogas mentioned previously in this section demonstrate that the condition of women’s health is improved through the use of biogas in the home. This is due to the fact that women are primarily responsible for domestic task like cooking and thereby are disproportionately exposed to smoke from solid fuels.¹¹⁵ Similarly, women are generally tasked with responsibility for fuel collection, and therefore are the largest group affected by the long distances faced in collect-

¹¹³ Amol R. Dongre and Prdeep R. Deshmukh, “Farmers’ Suicides in the Vidarbha Region of Maharashtra, India: A Qualitative Exploration of Their Causes,” *Journal of Injury and Violence Research* 4, no. 1 (January 1, 2012): 2–7, doi:10.5249/jivr.v4i1.68.

¹¹⁴ Christiaensen and Heltberg, “Greening China’s Rural Energy.”

¹¹⁵ See both Pokhrel et al., “Case-control Study of Indoor Cooking Smoke Exposure and Cataract in Nepal and India.” and Christiaensen and Heltberg, “Greening China’s Rural Energy.”

ing fuel. Given the traditional role of domesticity ascribed to women in rural society, the newly available time saved by biogas allows women to engage in activities that help to empower women in society (especially the opportunity to generate their own income) while at the same time contributing to the improvement of wellbeing in the household. In this way biogas addresses the means by which a group that has traditionally been marginalized is able to adopt a greater level of participation in improving their lives than they were able to do previously.

I have sought to illustrate several of the possible avenues through which biogas technology is able to make substantive improvements in the wellbeing of households in rural communities. Biogas is very much participatory in its orientation toward the individual – tasking households to take on a direct role in the improvement of their lives and offering additional opportunities in which to do so. Even so, biogas poses a challenge to the kind of equitable development necessitated by a unified approach with participation at its core. The next section will evaluate how biogas sometimes fails to address, and in some instances even propagates, these inequities in participation.

Unresolved inequalities in rural biogas implementation

Despite the great potential for biogas to rectify many longstanding challenges in rural development, it is not without its own set of complications that arise during its implementation. Namely, the use of biogas, as with many technologies introduced through development, instigates a new set of inequalities that must then be addressed by communities and practitioners. Broadly speaking, biogas highlights three types of inequalities that result from its use in development programs. The first is the tendency to systematically exclude particular sectors of rural society. The landless and the extremely poor are at greatest risk of exclusion based on a lack of available prerequisite inputs to maintain a functioning biogas plant. The second is the lack of continual, long-term support networks for the maintenance and repair of existing biogas plants. As it stands, a majority of plants worldwide fall into disrepair, with local groups and government offices insufficiently trained to address the needs of their constituencies with respect to biogas technology. The third form of inequality arises in communal biogas projects, which are predisposed to phenomena like the tragedy of the commons that diminish the social utility of the system. In each of these three areas, one witnesses a differential level of assistance that varies systematically based on sociocultural factors. This disproportionate assistance itself propagates new inequalities that are rich in their socioeconomic implications. The task at hand is to expand on the nature of these inequalities and how they arise, so as to design more effective participatory methods of combatting them.

The most vital concern for biogas programs is that the requirements of the system itself result in a differential ability for community members to participate. This is due to the fact that, by virtue

of socioeconomic and geographic circumstance, those who are presently capable in of maintaining a biogas plant are preferred in the selection of applicants for biogas programs. To be sure, it is inadvisable to invest in a biogas plant when a household has no means of sustaining it.¹¹⁶ Such a scenario just results in an additional financial burden for all those involved. Nevertheless, a biogas program that operates exclusively along this framework cannot truly be said to be inclusive of the whole community or improve the wellbeing of each segment of the community equally.

Often times in the implementation of biogas programs it is the poorest segment of society that stands to benefit the least. The poorest in society own little land with which to farm or raise livestock, and consequently have no means of furnishing the inputs required to maintain a functioning biogas plant.¹¹⁷ As a general indication of viability, the Government of India estimates that it requires at least three cows to produce enough manure to sustain a plant.¹¹⁸ Other organizations impose tougher criteria for identifying biogas candidates.¹¹⁹ For those that are therefore able to participate in these programs, the substantial benefits of biogas in terms of health, productivity, finances, etc. begin to accrue. Over time, the household is better off. At the level of the village or community, however, the result is an increase in economic inequality between the poorest and comparatively well-off segments of society. The poorest are often disadvantaged systematically based on other social and cultural factors as well; further driving a wedge between the poorest and the rest of the community in terms of economic opportunity serves to increase the likelihood of socioeconomic tension moving forward. By all rights, it is the reduction of these inequalities and an easing of these tensions that a participatory development project ought to strive for. Moving forward, it is most constructive to recognize the potential that the increasing returns in opportunity that biogas affords, and consider methods to extend these benefits to the community as a whole.

Under a conventional biogas implementation scheme, the poorest are unable to receive critical improvements in health, financial stability, and productivity that are realized by biogas recipients. Because comparatively well-off farmers enjoy a disproportionate representation in biogas programs, the effect is such that the poorest risk being left behind while the community engages in development to their exclusion. In the realm of health, it has been noted that the use of biogas as a fuel for indoor

¹¹⁶ Chandra Shekhar Sinha and Tara Chandra Kandpal, "A Framework for the Financial Evaluation of Household Biogas Plants in India," *Biomass* 23, no. 1 (1990): 39–53, doi:10.1016/0144-4565(90)90072-R. The authors note that when households lack sustainable access to the basic inputs for biogas digesters there is little that one stands to benefit from the technology.

¹¹⁷ See both Stuckey, "Social, Economic, and Technical Considerations of Biogas Implementation in the Third World," and Christiaensen and Heltberg, "Greening China's Rural Energy."

¹¹⁸ Programme Evaluation Organisation Planning Commission, *Evaluation Study on National Project on Biogas Development*.

¹¹⁹ Kamalnayan Jamnalal Bajaj Foundation, *Kamalnayan Jamnalal Bajaj Foundation Annual Report 2011-2012* (Maharashtra, India: Kamalnayan Jamnalal Bajaj Foundation, 2012), www.bajajfoundation.org. The Kamalnayan Jamnalal Bajaj Foundation biogas program identifies villages where the average cattle per household is between four and five.

cooking carries tremendous potential to reduce disability and illness that stem from traditional cooking practices. Because of the clean-burning nature of biogas, those that perform cooking tasks indoors are not subject to the same degree of smoke-related respiratory risks or the formation of cataracts.¹²⁰ These conditions pose a serious threat to overall quality of one's life as well as the ability to maintain and support the livelihoods of the individuals in the household. In rural India, it is predominantly women who engage in domestic duties such as cooking, and consequently are at greatest risk of these adverse health conditions. When evaluated in the aggregate, it is not difficult to see that conventional biogas programs consequently do little to improve the health conditions of the poorest women in the community.

In the long-term, one might expect to find evidence of this state of affairs in diminished longevity and capacity for productive labor among this disadvantaged class relative to the community at large. Similarly, those who are unable to acquire a biogas plant cannot gain the additional benefits of improved sanitation, which stem from the consistent removal of waste from the living environment. To the extent that more well-off members of society implement biogas while the poorest do not, the former group enjoys an increased protection from infectious disease relative to their peers. This is an important concern to bear in mind because the vitality of a household is dependent on the ability of its adult supporters to continue to earn an income or otherwise maintain the condition of the household by staying healthy. As such, the poorer are more susceptible to destabilization in their livelihoods due to this greater risk of illness. The pattern illustrated here is one of increasing returns. Those that lack the initial opportunity receive little to no benefit while the returns compound for those that participate in the program. Research discussed previously in this chapter also noted that there is potential for farmers to realize an additional financial benefit from biogas programs by way of reduced costs in fertilizer purchases. As with health, this financial benefit does not confer itself on farmers who do not receive a biogas plant. For subsistence farmers, this means that those with a biogas plant enjoy a further reduction in costs in order to provide food for themselves and for the market. This is a potentially disadvantageous position, in that these farmers may already lack sufficient livestock to produce enough manure to fertilize their fields, and so may spend an additional portion of their income on fertilizer.¹²¹ This differential ability to make ends meet in the long-run might manifest itself as a greater proportion of farmers with functioning digesters continuing to farm

¹²⁰ See both Gautam, Baral, and Herat, "Biogas as a Sustainable Energy Source in Nepal," and Pokhrel et al., "Case-control Study of Indoor Cooking Smoke Exposure and Cataract in Nepal and India."

¹²¹ Ding, Wu, and Li, "Cost Effectiveness Analysis of Household Biogas Plants in China."

as the poorest are unable to maintain an income via subsistence farming. Once again, initial opportunity begets further opportunity, which serves to isolate the already marginalized segments of society.

Productivity is another crucial area in which biogas differentially confers its benefits on the comparatively well-off in society. It has been well-documented in the literature on biogas that, prior to the introduction of biogas digesters, households must often travel great distances in order to acquire fuel for wood burning stoves. This is an expenditure in time on the order of several hours each day. Most often, it is women who are delegated with the responsibility of fuel acquisition and who accordingly stand to benefit the greatest from biogas. As such, it is the poorest women in society who are disadvantaged as a result of the inability to acquire a biogas plant. By contrast, the better-off peers of these women are able to channel that newly available time into either income-bearing activities, additional domestic work, or leisure. Many researchers and practitioners speak of biogas as a tool to further empower women in rural villages and communities. However, while the potential to improve the well-being of women through biogas is certainly great, that potential is nevertheless inaccessible to all but a certain subset of women in society. As such, the benefits of biogas cannot be said to distribute themselves uniformly within the community.

Another complicating factor in the use of biogas is that the return on the household's investment in terms of biogas production differs with respect to the temperature of the environment. Geography – specifically, where one lives – becomes important in determining whether biogas will be an effective means of improving quality of life in rural areas. Some researchers have noted that if the local geography differs significantly from the subtropical and tropical context that characterizes most biogas programs in China and India, lower temperatures result in a reduced output of biogas per kilogram of manure input into the system.¹²² Addressing this engineering challenge, researchers note, requires a sizeable investment in further academic research and development. The most critical finding thus far suggests that households in cooler environments must spend some amount of fuel in heating the biogas digester so as to facilitate the process of anaerobic digestion.¹²³ This additional temperature requirement may even be a factor in subtropical environments. Another research group found that farmers in Vietnam required an additional pig (increasing the total number of pigs on the

¹²² Ivet Ferrer et al., "Biogas Production in Low-Cost Household Digesters at the Peruvian Andes," *Biomass and Bioenergy* 35, no. 5 (May 2011): 1668–74, doi:10.1016/j.biombioe.2010.12.036. The authors note that biogas is best suited to particular climatic conditions (consistently warm temperatures like those found in tropical regions).

¹²³ Ding, Wu, and Li, "Cost Effectiveness Analysis of Household Biogas Plants in China." The authors briefly mention the fact that not every climatic context benefits in the same way from biogas.

average farm from 16 to 17) in order to produce enough manure to maintain a plant when temperatures fall below 20° Celsius.¹²⁴ Thus, whereas the unavailability of inputs poses a threat in the form of instigating local inequalities, geography and climate reflect the formation of inequalities at the regional level. For certain regions, even within countries with extensive biogas programs like India and China, the use of biogas is more feasible than in others where environmental factors limit the effectiveness of the system. A development agenda that seeks to improve the well-being of society as a whole should remain cognizant of this fact and devise alternative solutions in those places where the barriers to biogas entry prove insurmountable for a large proportion of the population.

By and large, most biogas implementation programs conducted by governments and NGOs focus on the construction of new household plants. While increasing the presence of biogas in rural communities is a vital effort, it has been done thus far to the neglect of maintenance and support for existing plants. Researchers noted in 2007 that only 60% of existing digesters in China at that time were fully functional.¹²⁵ A similar study conducted by the Government of India in 2002 found that only 45% of digesters in India were fully operational at that time.¹²⁶ Although heavily subsidized by the government and third-parties, the construction of a biogas plant is a costly endeavor for the recipient. The failure of a biogas plant in the short term is thus a serious economic threat to the recipients' livelihoods, and has the potential to negate many of the benefits that would have been realized by the ability to use the plant. Moreover, by losing the functionality of the biogas plant, one risks an overall return to a decreased standard of living as the combined returns from health, sanitation, productivity and finances begin to diminish. Some effects are felt immediately. For instance, women are likely to resume traveling long distances for the collection of fuel in order to perform tasks like cooking or heating the home. As noted earlier, this requires a sizable devotion of one's time during the day, and as such reflects a diminished ability to participate in activities that promote women's engagement and participation in society. Similarly, exposure to smoke and other adverse health risks due to burning solid fuel indoors poses a serious health threat especially to women and children within the home. Other effects are felt more gradually, such as increased susceptibility to disease over time as agricultural and human waste is no longer fed to the digester and instead collects in areas surrounding the living environment. Likewise, costs may begin to increase as some subsistence farmers find they need to begin purchasing fertilizer again to replace the treated product they receive from the digester. In the absence of other development interventions to reinforce the gains realized

¹²⁴ Charlotte Rennuit and Sven Sommer, "Decision Support for the Construction of Farm-Scale Biogas Digesters in Developing Countries with Cold Seasons," *Energies* 6, no. 10 (October 18, 2013): 5314–32, doi:10.3390/en6105314.

¹²⁵ Chen et al., "Household Biogas Use in Rural China: A Study of Opportunities and Constraints."

¹²⁶ Programme Evaluation Organisation Planning Commission, *Evaluation Study on National Project on Biogas Development*.

through biogas, households thus depend upon an operational plant in order to sustain the increased standard of well-being. To the extent that biogas does not receive institutional support and maintenance in the long term, the technology offers only a temporary reprieve from conditions of economic hardship and does little to prevent some households from falling back into poverty.

A lack of support infrastructure tailored toward the maintenance of biogas plants and educating communities and regional officials about biogas technology is the primary cause of the high rate of non-functionality.¹²⁷ As previously stated, most biogas programs run by government organizations and non-profit groups focus exclusively on providing access to funding and installation resources for households. Researchers operating in China have noted that this circumstance has resulted in a dearth of capable government staff who are educated in biogas technologies and able to instruct households on proper maintenance and repair.¹²⁸ Others have noted similar circumstances occurring in rural India, remarking additionally that the lack of parts and expertise for repairs is a major contributing factor to biogas plants becoming non-functional. Consequently, researchers in this area surmise that the introduction of viable biogas support networks is pivotal to increasing retention of functioning plants.¹²⁹ Indeed, without such support mechanisms, biogas acts solely as a (costly) short-term intervention. The long-term benefits to quality of life require a functioning plant operated by individuals that have received training in its use and can reach out to an existing infrastructure to secure parts and labor for repairs. One such initiative has been undertaken by the Kamalnayan Jamnalal Bajaj Foundation by providing resources for a local individual to establish a store specializing in the sale of biogas repair parts. This entrepreneurial approach appears promising thus far¹³⁰. The need for the creation of biogas support infrastructure reveals much about the opportunity for biogas technology to act as an inclusive participatory technology. At one level, biogas provides an increase in wellbeing for a single household that acquires its benefits exclusively. Considered at this level alone, it would appear to require every household to be furnished with a biogas plant in order for every member of society to experience an increase in wellbeing. Not only do program resources typically this from occurring, it has also been shown that not every member of society possesses enough land or livestock to make the operation of a biogas plant feasible. However, when one considers that there exists also the need for an extensive support network to support current digesters, it becomes apparent that a larger proportion of society can be included in the process by fulfilling a particular role in that network. There is a need for biogas educators, repairpersons, parts vendors,

¹²⁷ Bond and Templeton, "History and Future of Domestic Biogas Plants in the Developing World."

¹²⁸ Chen et al., "Household Biogas Use in Rural China: A Study of Opportunities and Constraints."

¹²⁹ Bond and Templeton, "History and Future of Domestic Biogas Plants in the Developing World."

¹³⁰ The final section of this chapter will discuss the Bajaj entrepreneurial case study in greater depth.

government liaisons, etc. In this way, biogas can be made a more effective means of increasing household wellbeing while also including more members of the community than would have been able to participate otherwise.

Some have argued that, because household biogas plants typically only benefit the occupants of the household that receives the plant, biogas plants installed and operated at the village level are a better alternative. The argument made by proponents of this strategy is that household digesters are inequitable in that certain sectors of society are excluded from participating, and as such the benefits only accrue to the select group who are eligible for the program.¹³¹ By contrast, communal plants are said to be more equitable in that each member of society stands to benefit from the installation of the plant. Nevertheless, communal plants have not been successful in most applications attempted thus far. As of 2010, only 3902 communal plants have been constructed in India, which is home to roughly 600,000 villages.¹³² Conversely, India has witnessed the installation of approximately 4 million household-sized biogas plants.¹³³ Researchers have further found that a majority of attempted communal plants ultimately fall into disuse.¹³⁴ Despite the best intentions of those involved, communally owned or operated projects often suffer from the tragedy of the commons, or similar scenarios in which the individual incentives of community members in the aggregate contravene against the realization of the optimal social good. It is worthwhile to illustrate hypothetically how such might be the case with a communal biogas plant. Suppose, for instance, that the community required all those who were able to supply the digester with enough waste and manure to operate the plant and produce biogas fuel. Each household in the community would then be entitled to some portion of the fuel produced that period; fuel from biogas in this scenario acts as a common good. However, it is true that more fuel allows one to accomplish more than if one had less fuel. One can use it to cook more meals, heat or light the home for a longer period in the night, etc. There thus exists an incentive for individuals to exceed their allotted share by some amount. If everyone were to do so, some members of the community would be left with a reduced (or completely exhausted) share of the biogas for that period. The affected individuals have a reduced incentive to maintain a functional biogas plant because they will receive less benefit relative to their efforts. When the affected individuals are also those that supply the digester with manure, there exists an additional incentive to supply less manure to the plant (assuming that there is an alternative use for it) as their share of fuel from the plant is

¹³¹ Stuckey, "Social, Economic, and Technical Considerations of Biogas Implementation in the Third World."

¹³² National Renewable Energy Laboratory (NREL), *Indian Renewable Energy Status Report: Background Report for DIREC 2010* (U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, October 2010), <http://www.nrel.gov/docs/fy11osti/48948.pdf>.

¹³³ Bond and Templeton, "History and Future of Domestic Biogas Plants in the Developing World."

¹³⁴ Bettina Bluemling and Ina de Visser, "Overcoming the 'club Dilemma' of Village-Scale Bioenergy projects—The Case of India," *Energy Policy*, September 2013, doi:10.1016/j.enpol.2013.08.032.

reduced. Consequently, the available share of biogas diminishes still further due to the reduction in inputs. A similar scenario in India was outlined in a case study by Bluemling and de Visser, who found that this “goods” framework was useful in understanding why communal biogas plants so often fell into disuse. The study found that biogas in this circumstance was a “club good” and came to be afflicted by the “club dilemma”.¹³⁵ In this scenario, the use of biogas is made exclusive to those who are willing and able to support it with the requisite expenditure of inputs and maintenance. As such, members expect to receive a certain level of benefit that makes their participation worthwhile. According to Bluemling and de Visser, given fluctuating membership in the club, however, the club is forced to either expand its membership or reduce the quality of services provided. As service is extended beyond its capacity or otherwise diminished, members perceive less of a value from participating and begin to drop out. In terms of biogas, this suggests that participants perceive that they are receiving less biogas than is commensurate with their input, and so find that this investment is best made elsewhere. In the long-run, suggests Bluemling and de Visser, membership in a biogas affiliation disbands and the biogas plant itself falls into disrepair. In this way, a system that was intended for to address the resultant socioeconomic inequality of household biogas plants itself engenders inequalities in participation that prevent it from becoming effective. This is a challenge that must be addressed should one seek to employ communal biogas as a means of scaling biogas technology to reach a much larger number of villages.

One must also note that the disuse of the communal biogas plant leaves the community worse-off given their initial investment. Substantial time, labor, and financing is required to set-up and install a large digester.¹³⁶ The return on this devotion of resources is only truly realized over the long-term. Thus, failed communal digesters (like their household counterparts) are more likely to pose a long-term loss rather than a gain without an effective means of assuring its continued operation. Such failures to realize a substantial benefit may cause some in the community to be wary of ‘outside’ interventions, thereby limiting the future likelihood of implementing large-scale projects in the future.

We have seen how biogas in both the household and communal form poses important challenges with respect to addressing inequalities in the development process. Household biogas, by its private nature, confers benefits in health, sanitation, productivity, and income only to members of the household itself. Furthermore, the input requirements of the biogas system itself additionally

¹³⁵ Ibid.

¹³⁶ It is useful here to return to the work of Sinha and Kandpal, “A Framework for the Financial Evaluation of Household Biogas Plants in India.” Though working predominantly within the scope of household biogas, their comprehensive quantitative analysis of the variables that impact the viability of biogas is useful in identifying the kinds of costs one is likely to encounter for a community digester as well.

restricts eligible participants to those who already possess sufficient means in society. Although likely not intended by any practitioner, the poorest in society, and thus the most in need of intervention, are systematically excluded. Similarly, geography matters in the implementation of biogas systems. Some localities require greater effort than others to maintain a functioning plant. The extra expenditure can prove crucial particularly in unstable environments where input availability may already be in question. The lack of long-term institutional support for maintenance and repair of plants limits the viability of biogas as a long-term improvement in the wellbeing of individuals and communities. Finally, even communally operated plants, which seek to address some of the inherent inequities of household biogas, fall prey to disproportionate support and utilization a la the tragedy of the commons of the club dilemma. These social phenomena limit the effectiveness of communal biogas as a solution in substantively improving wellbeing. By evaluating biogas under the framework of participation it is possible not only to recognize and assess these concerns, as has been attempted in this section, but also to design methods with which to combat these issues in a way that is comprehensive and beneficial in the long term. Designing such methods is the task of the remaining section of this chapter.

Chapter III: Case Study of the Kamalnayan Jamnalal Bajaj Foundation

A Brief Overview of Wardha and the Bajaj Foundation

The purpose of the following explication and analysis of Wardha District in central India is two-fold. Wardha is the primary location of development programs conducted by the Kamalnayan Jamnalal Bajaj Foundation, which is the focus of the ensuing case study. This analysis will provide social and historical context to the local environment and conditions that impact that program. Additionally, this analysis will serve as an example of how future researchers and practitioners interested in rural development methodology can combine a high-level, research and policy-driven approach with a strong emphasis on local expertise to create a holistic understanding of a region and the problems it may face.

The rural Wardha District lies in Maharashtra province in the central region of India. Site of the last ashram of Mahatma Gandhi, Wardha was a spiritually and politically important area during the Indian independence movement and formation of the state. Despite this notable history, Wardha remains predominantly rural, with the majority of its inhabitants engaging in traditional forms of subsistence agriculture. As per the 2011 Indian Census, the total population of Wardha District is 1,236,736, with 73% of which categorized according to the census as “rural”. Wardha is comprised of 154,415 individuals designated by the government as Scheduled Tribe, with an additional 158,630 individuals recognized as Scheduled Caste.¹³⁷ Assuming that these two categories are mutually exclusive, this places 25% of Wardha’s population within the traditionally lowest ranks of India’s caste-based social hierarchy. Subsistence farming is the predominant occupation for most of Wardha’s rural inhabitants, which is made difficult by the geography of the area. Living the final years of his life here, Gandhi imbued the region with a historical and cultural significance for the Indian independence movement and subsequent formation of the state. It is against this background of immense national importance that Wardha’s endemic struggle with poverty is most stark.

Over the last decade, a massive increase in the number of suicides by subsistence farmers has occurred in the Vidarbha region. Researchers Dongre and Deshmukh investigate the causes for the upward surge in farmer suicides in the Vidarbha region of Maharashtra, which includes Wardha district. Drawing on their own statistical analysis and the conclusions drawn by previous research (in part by the Indira Gandhi Institute of Development Research), the authors present a list of eleven core factors influencing the suicide rate in Vidarbha. These are: Debt, Addictions, Environmental problems, Poor price for farm produce, Stress and family responsibilities, Government apathy, Poor

¹³⁷ Office of the Registrar General & Census Commissioner, India, *2011 Census of India*.

irrigation, Increased cost of cultivation, Private money lenders, Use of chemical fertilizers, and Crop failure.¹³⁸ Of these, Dongre and Deshmukh highlight the spiraling cycle of indebtedness as particularly crippling on the economic plight of farmers in the region, and emphasized the need for participatory approaches toward managing these conflicts in a way that afforded farmers and their household's agency in the process. The authors emulated this participatory approach in their own research, which included roundtable discussion with farmers in Wardha and circulation of their findings to members of the community. Ultimately the researchers conclude that, although their study delineates the perceived cause of suicide in a limited geographical region, further study is required to confirm their findings and steps must be taken at the local level to mitigate the damage these factors have caused to the farming community.¹³⁹

Subsistence farming in Wardha follows long-standing traditional methods, which are known to have limited efficiency, lack of sustainability, and often harmful effects toward the environment.¹⁴⁰ Interventions aimed toward rectifying some of these issues have realized the extreme importance of operating with sensitivity to the local social and historical context. For instance, a study of farmers' preference for chemical pesticides versus Neem pesticide, organically derived from the Neem tree that naturally occurs throughout India, found that several barriers to adoption of new technologies prevented widespread use of organic pesticide in Wardha. Of these, researchers noted that lack of knowledge about Neem, fear of stigmatization for "backward" practices, and concerns over the risk of unstable income to be of particular importance.¹⁴¹ The study conducted on pesticide use in Wardha highlights some of the key challenges toward implementing policy or introducing new technology in rural agricultural settings. While agricultural professionals may debate the importance of using organic pesticide, it nevertheless remains the case that hesitancy, resistance, or slow adoption on the part of the farming community limits the intended effectiveness of rural development programs.

The social and geographical characteristics of Wardha outlined above inform the work of the predominant NGO operating in the district. The Kamalnayan Jamnalal Bajaj Foundation was founded by the heirs to prominent Indian philanthropist and social activist Jamnalal Bajaj. A close friend of Mahatma Gandhi, Jamnalal helped Gandhi to establish an ashram in Wardha; consequently, the region is known for the important figures that made their home and lives there. Given the important

¹³⁸ Dongre and Deshmukh, "Farmers' Suicides in the Vidarbha Region of Maharashtra, India."

¹³⁹ Ibid. The researchers briefly mention the National Mental Health Program as one possible channel.

¹⁴⁰ Kamalnayan Jamnalal Bajaj Foundation and The Livelihood School, *Livelihood Promotion Through Developing Natural and Human Resources: The Wardha Experience* (Maharashtra, India, 2011), www.bajajfoundation.org.

¹⁴¹ Abhay Joshi and Jihei Kaneko, "Factors Affecting the Decision-Making of Farmers Concerning the Application of Neem Pesticide in Nagpur and Wardha, India: A Case Study of 'The Neem Foundation,'" *Journal of Food, Agriculture & Environment* 8, no. 1 (January 2010): 363–66.

legacy of Wardha in Indian history, the Bajaj Foundation has committed to the socioeconomic development of the region so as to reverse the tide of growing poverty and destitution that has befallen the area. The organization currently operates in 201 villages within Wardha district, and places preeminent emphasis on the enabling of individuals to make “constructive and significant changes in their lives.”¹⁴²

The Bajaj Foundation is highly active in Wardha predominantly as an advocate and resource for community-based development programs in the area. The Bajaj Foundation utilizes its resources predominantly in the field of agriculture, with the hopes of improving the quality of Wardha’s rural poor. The programs that the Bajaj Foundation currently operates relate to water and irrigation management (whereby the organization provides capital and resources for mid-scale public works projects that would otherwise not be completed), training and education in sustainable agricultural practices, livestock provision, and women’s community and labor participation outreach. To that end, the methods most highly advocated for and employed by the Bajaj Foundation are participatory in nature, allowing members of the communities and villages in Wardha to assume an integral role in the development process. Of particular note for this paper is the Bajaj Foundation’s biogas implementation program, which will serve as a case study in comparing attitudes and approaches toward rural development. The Bajaj biogas program provides assistance to individuals in determining the feasibility of a biogas plant, acquiring the necessary funding, and constructing and operating the plant itself.

Participatory Biogas Interventions

One of the means by which the Bajaj Foundation addresses the challenges of inequality in biogas distribution is through capacity-building and education.¹⁴³ This approach has the most wide-reaching impact among the villages in which the foundation operates. The Bajaj Foundation utilizes its extensive network of resources and penetration at the village level to invest heavily in developing appropriate skillsets for biogas users to reduce the likelihood that a plant will become nonfunctional. The purpose of this program is to foster user competency in the daily operation of the plants, so as to minimize the risk of even minute issues that could lead to future complications. Vital to this effort is the use of specially trained individuals from local communities as both advocates and educators in biogas technology. As fellow members of the village community, the presence of these volunteers allows the Bajaj Foundation to maintain a persistent local presence in the community so as to promote proper maintenance and respond quickly to any troubleshooting issues that arise. Additionally,

¹⁴² Kamalnayan Jamnalal Bajaj Foundation and The Livelihood School, *Livelihood Promotion Through Developing Natural and Human Resources: The Wardha Experience*. (p. iv)

¹⁴³ Kamalnayan Jamnalal Bajaj Foundation, *Kamalnayan Jamnalal Bajaj Foundation Annual Report 2012-2013*. p.59

the use of community members for these advocacy roles fosters a sense of support and communal responsibility for the shared success of the biogas program. The philosophy behind this approach, according to the Bajaj Foundation, is that communities are empowered in such a way that they can take over ownership of the development process. The Bajaj Foundation adopts the role of facilitator in this transition by providing a platform for resources and education. The second component of this capacity building program is the dissemination of biogas knowledge to the community at-large. The process includes an intensive effort through both word-of-mouth (peer education) and media tools that has met with success in informing existing owners and fostering greater interest among village communities. With respect to word-of-mouth tactics, the Bajaj Foundation has focused specifically on using women's Self-Help Groups to identify candidate households with the intention of empowering women in the community.

Beyond education and capacity building, the Bajaj Foundation intervention establishes a maintenance and support infrastructure for biogas owners. The primary activity conducted by representatives of the foundation (i.e. volunteers from target villages) is the active monitoring and inspection of biogas plants. Conducted by individuals from the community who have been trained specifically in biogas technology, these volunteers fulfill the dual purpose of serving as a direct point of contact with households regarding their plants while at the same time building rapport and fostering interaction within the community. In this role, these volunteers act as a liaison between villages and the Bajaj Foundation to provide access to additional resources at the organization's disposal. Especially for remote areas, this includes the acquisition of repair parts. The establishment of an external support infrastructure for biogas through local or regional government channels would entail a sizeable investment that may become trapped in potentially lengthy bureaucratic processes. The Bajaj Foundation circumvents this necessity by relying extensively on local villages for the necessary human network and resources. Doing so both fosters a comparatively cheap and more robust support infrastructure and challenges the rural community itself to be self-sufficient. In this way, the community itself is empowered to take ownership of the development process.

The most innovative and promising approach with which the Bajaj Foundation addresses biogas issues is through the facilitation of local entrepreneurship. Difficulties in procurement of biogas parts in rural or otherwise remote areas are a major factor in the abysmally low rate of functionality of existing biogas plants. The infrastructure required to purchase parts and repair services is simply non-existent. As of this year, the Bajaj Foundation has sought to rectify this issue by providing support for a local villager to establish a shop that sells biogas supplies.¹⁴⁴ To date, the Foundation has

¹⁴⁴ Ibid. p. 61-63

provided an initial start-up loan to the individual, who has consequently established a physical presence and an inventory of biogas parts. The foundation reports that the success of the venture has enabled the individual to begin selling additional supplies for agricultural and household applications. Like many of the other ventures supported or run by the organization, this experiment in rural entrepreneurship is conducted foremost by the local villager themselves. In this case, the Bajaj Foundation serves as a conduit to resources and opportunities that would have been difficult to interact with on one's own. For instance, the Bajaj Foundation is able to link the local entrepreneur with suppliers and others with which to establish formal business relationships.

Taken in conjunction with the rest of the Bajaj Foundation's methods of responding to challenges in the equitable promotion of biogas, this new focus on local entrepreneurship speaks to a critical but hitherto unmentioned component of their success. Each of these additional interventions acts to increase the scope of the community that is brought in contact with biogas programs. In some cases, this exposure offers new opportunities for employment or participation in the village's development, even for individuals that do not own a biogas plant themselves. In other cases, this widespread exposure to the benefits of biogas causes other individuals to take steps toward achieving the ability to acquire a plant themselves. Ultimately, it is the participation of the individual in all its possible forms that this style of development intervention seeks to emphasize.

The use of local entrepreneurship to combat the lack of maintenance support for biogas digesters is still in its infancy and as such much more time and observation is needed before it can be said with any degree of certainty that this approach offers a viable means of addressing the problem. The local entrepreneur working with the Bajaj Foundation has himself dealt with difficulties in sustaining sales so as to continue the operation of the store. To help alleviate this concern, the entrepreneur has requested additional funding and support from the Bajaj Foundation. Consequently, with such a limited sample size (of only one individual) it is quite difficult and perhaps foolhardy to make any preliminary claims about the long-term sustainability of this type of intervention in rural India. That being said, it is certainly a novel approach and one in which continued research would both enhance the academic understanding of the effectiveness of different types of development interventions as well as a more refined understanding of the requirements in making household biogas technology scalable at the regional or national level.

Redressing inequalities and reproaching interventions

Despite these well-deserved successes, the Bajaj Foundation approach to development interventions does not represent a "one-size-fits-all" solution to inequalities in participatory methods of

development. Rather, it must be acknowledged that several limitations related to the particular circumstances of the Bajaj case study restrict the applicability of these approaches elsewhere. Namely, the Bajaj Foundation is able to conduct many of its operations thanks to the access to capital and resources available to it, its strong presence in rural villages, and the support the organization receives from these communities. Suffice it to say that the particular circumstances facing development organizations at the local level vary considerably. Those with sufficient resources and existing rapport are likely to find themselves able to make inroads at the same scope as the Bajaj Foundation. Still other organizations find themselves unable to tackle challenges this large individually. Taking a step back to assess the situation at the national scale, one must note that even the scope of the Bajaj biogas program is small relative to the challenge of improving the quality of life of the whole of rural Indian society.¹⁴⁵ While the Bajaj Foundation operates in numerous villages in Wardha district, the total number of biogas plants installed with the assistance of the organization stands at 791 across 139 villages. Each of these households is served by the local network of biogas volunteers. Rural India as a whole, however, boasts over four million biogas plants. There is consequently much work still to be done toward providing rural areas with a sustainable energy solution that will reduce the burden of poverty in these communities. It is the task of future development researchers to formulate methods of emulating the successes of the Bajaj Foundation under greater resource constraints so as to greatly expand the reach of the positive feedbacks their participatory approach enables on a much larger scale.

It must also be noted that, in the strictest sense, the Bajaj Foundation biogas intervention mechanism itself does not directly address the fact that the poorest in the community are unable to afford or sustain their own plants. While much is done on the part of the organization to devise methods of reaching out to this group through many of their other development programs, as of yet biogas and the myriad benefits it confers is as of yet out of reach. Consequently, the greatest inequality resultant from differential access to biogas remains unresolved.

It is necessary to briefly revisit the discussion of the scale of biogas implementation that was conducted in the second chapter, this time in the context of the Bajaj Foundation's approach to development interventions. In that discussion, it was noted that some researchers believe community biogas to be a valuable and necessary method of implementing the technology so as to insure its equitable use. Others, however, more strongly criticize community-based biogas plants because of

¹⁴⁵ Programme Evaluation Organisation Planning Commission, *Evaluation Study on National Project on Biogas Development*. This government study noted that in order to fully realize the potential of biogas a much greater percentage of the population must have access to and use the technology. The report argues that this is not feasible with household digesters, and instead rural areas must rely on community-based plants.

their poor track record in development programs. As mentioned, the Bajaj Foundation utilizes solely household biogas digesters due to the organization's mission philosophy of empowering individuals to take on a direct role in the improvement of their own livelihood. Additionally, the costs of installing a large digester, given the low probability of long-term success, are generally difficult to justify. The feasibility of a community-based biogas plant that has access to the kind of support network and resource infrastructure available to the Bajaj Foundation is as of yet untested. While there is no incontrovertible reason to suggest that the availability of these resources will alleviate the problems that community plants encounter, the long-term village presence maintained by the Bajaj Foundation provides a unique opportunity to undertake a more detailed analysis of the social and cultural factors that lead to a plant becoming inoperative. The Bajaj Foundation is not currently interested in pursuing community-based plants themselves; however, researchers might look toward Wardha District as a potential area with adequate logistical resources to carry out a longitudinal study in this arena.

Future Directions

Proposing a census of Wardha District biogas functionality

Moving forward, there is a need to quantitatively assess the impact of the Bajaj Foundation's targeted biogas interventions, particularly related to their effectiveness at expanding the lifecycle and functionality rate of the digesters. This information will enable the Bajaj Foundation to make informed decisions about the direction of the program and tailor details of the program so as to further increase its effectiveness. While much of the infrastructure is currently in place within the organization to carry out this task, it has not yet been undertaken as of yet. The results of this study will provide development practitioners with important evidence as to the viability of conducting tightly integrated development interventions of their own. While not all NGOs and other development organizations that operate on a local scale conduct programs that are long-term in nature, the Bajaj Foundation approach to biogas technology is decidedly longitudinal in nature. As such, organizations that look to replicate the program in other regions necessarily require a substantial investment in resources (human capital, financing, local support and rapport, etc.) in order to successfully operate such an endeavor. Therefore, evidence regarding whether the Bajaj Foundation approach to maintenance and support infrastructure is able to reduce the number of non-functional plants would be welcome information for development practitioners looking to mitigate some of the risk of establishing a similar program.

In the interest of aiding future practitioners who might conduct such a study, a brief outline of intended objectives, requirements, and challenges will be addressed. The intended objectives of a Wardha District biogas functionality assessment are three-fold: 1) Ascertain the absolute number of

non-functioning biogas plants in the district and their locations; 2) determine the proportion of biogas plants that are non-functional relative to the total number of biogas plants installed with the assistance of the foundation; and 3) determine the average operational time of a biogas plant before it is expected to become non-functional. The purpose of Objective 1 is to provide the Bajaj Foundation with an internal data source that the organization can use in further tailoring its maintenance and support operations for existing biogas users. While the organization currently relies on its network of village volunteers to identify affected households on an ad-hoc basis, the results of a comprehensive evaluation of biogas owners will provide a more robust understanding of the state of biogas in Wardha and the factors that affect it. Similarly, Objectives 2 and 3 have utility for the Bajaj Foundation in further improving their program, and have additional value to biogas researchers more generally in determining whether the foundation's locally-embedded approach to maintenance and support is a feasible avenue of exploration in other regional contexts.

There are several important requirements to consider in completing each of the objectives outlined for this proposal. Namely, this project would require at least one or more individuals who can travel to Wardha District and visit each of the 791 households with biogas plants to evaluate the functionality of their plant. There are 139 villages within Wardha District targeted by the Bajaj Foundation in their biogas program. It goes without saying that substantial travel will be required in this information-gathering task. While intimate knowledge of biogas technology would not be required, it is necessary for this individual or team to be able to interface effectively with local village members. Consequently, effective interviewing technique, general interpersonal skills, and familiarity with empirical research methods are a necessity. Furthermore, experience with data collection and database creation and management on the part of at least one member of the research team will greatly facilitate the ability to manage, analyze and present the information collected. Beyond general personnel requirements, there are additional foreseeable expenses related to travel, and on-site research. While such expenses might reasonably vary depending on the particular circumstances of a given research team, these might include airfare, lodging, meals, and work-related travel and supply costs.

Some challenges need to be overcome before the suggested proposal can move forward in accomplishing the outlined objectives. Foremost among these is the potential reticence that researchers may encounter among biogas plant owners who may be reluctant to admit that a plant is not functioning correctly out of a desire to prevent any negative feelings or ill-will with either the research team or the Bajaj Foundation. While likely unfounded, the bias in responses that can result from this tendency will render the results of the data collection unusable for analysis. Therefore, every precaution must be taken to mitigate this effect, through effective communication technique,

physically inspecting plants, etc. Researchers should specify in advance how they plan to address these concerns. Furthermore, proper attention to the format of assessment is critical in insuring that accurate and informative data is collected. While the Bajaj Foundation currently has a proposed survey that can be administered to biogas recipients, it does not collect information relative to functionality of the plant itself. It is recommended that this research team work closely with the Bajaj Foundation in designing a single questionnaire that targets the information that both teams seek so as to facilitate data collection. Additional challenges are more general to this kind of information collection. These challenges might include: building rapport with respondents, overcoming language barriers (including translation, illiteracy, or innumeracy), observing and remaining sensitive to local needs and customs, providing opportunity for feedback and criticism from respondents, etc.

Leveraging indigenous cows to increase biogas penetration

The Bajaj Foundation is in a unique position as it is involved in a wide range of development activities. These range from irrigation and large-scale public works projects, to educational workshops and individual capacity building, to the provision of financial subsidies for locally-driven projects. The organization's entrenched position in the villages of Wardha district afford the organization massive potential to work towards answers to the problem of inequality of access. The organization currently conducts several programs targeted directly to the poorest and most disadvantaged members of the community. Most notable in terms of this evaluation is the "indigenous cow" program. Under this program, the foundation subsidizes roughly two-thirds of the cost of a cow (native to the area) for interested individuals in rural villages.¹⁴⁶ The program is geared specifically toward impoverished subsistence farmers, many of whom are destitute and face little alternative to farming for income.¹⁴⁷ The hope is that, in providing these individuals with an indigenous cow, an additional source of income through the production of milk becomes available. The Bajaj Foundation notes in particular that this is an advantageous prospect for poorer women, who in many cases may be excluded from traditional income-bearing activities. The indigenous cow program has had great success in providing a tangible means of improving the financial plight of these farmers. In addition to this role, the indigenous cow program offers additional opportunities in assisting the poorest in acquiring a biogas plant. It has already been stated that sufficient availability of waste input is a barrier to biogas uptake. The existing framework of the indigenous cow program already serves as an initial point of access to these inputs, albeit for a different intended purpose. To the extent that funding and resources permit, the Bajaj Foundation can capitalize on this infrastructure with minimal alterations

¹⁴⁶ Kamalnayan Jamnalal Bajaj Foundation, *Kamalnayan Jamnalal Bajaj Foundation Annual Report 2012-2013*, pp. 78-86

¹⁴⁷ Dongre and Deshmukh, "Farmers' Suicides in the Vidarbha Region of Maharashtra, India."

in an effort to increase the proportion of the rural population that is eligible for biogas. This system need not even drastically shift the demographic target of the existing indigenous cow program. The poorest in society already targeted by the cow program benefit from the positive feedback of the initial provision of a cow – through increased income generation individuals are able to save some amount toward the eventual purchase of an additional cow. The income earned from the second cow, in addition to the first, accelerates the pace at which a third may be procured. At this point, having three healthy cows, the Bajaj Foundation estimates that sufficient input sources exist for the sustenance of a plant.

Granted, the scenario depicted here is far too overly simplistic. There is a non-negligible amount of risk that is not factored into the above proposition, reflecting the host of factors that could prevent a household from realizing an income or being able to save it (e.g. illness or death of a family member, illness or death of a cow, crop failure, repaying debt, or even large expenditures such as festivals and weddings).¹⁴⁸ Moreover, it neglects the difficulties posed by the very considerable time and effort required to save and build up resources to the point at which the acquisition of a biogas plant is feasible. Given the sheer number of individuals that could be served greatly by the indigenous cow program it may be in the foundation's best interest to favor candidates who have not yet received a subsidy (or do not already own livestock) for participation in the program. If such is the case, one should not expect the cost of subsequent unsubsidized cows to be as surmountable as the first. Nevertheless, the process from zero cows to biogas ownership is characterized by positively reinforcing feedback. Although initial progress is slow and arduous, over time the improvements to quality of life increase at an increasing pace. What results from this brief illustration is an awareness of the need for a long-term plan for the improvement of individual well-being in rural communities. For well-established programs like those conducted by the Bajaj Foundation, this primarily entails a reorientation in objectives and an allocation of the appropriate resources. For example, the organization's existing network of village volunteers might be tasked with assisting individuals in developing long-term strategies and savings goals toward ultimately owning a biogas plant and helping to track progress and address any issues along the way. For those with less-established infrastructure or resources, a long-term biogas development plan like the one briefly outlined here requires important strategic decisions about how to invest limited resources. The takeaway for development practitioners is that an equitable biogas assistance program is really a two-phase process – the creation of a

¹⁴⁸ While outside the scope of the present analysis, large communal festival and wedding expenditures (especially dowry) are non-trivial and a reality for many rural Indian families.

strong foundation of sustainable access to input resources necessarily precedes the construction of the plant itself.

The exposition outlined above is necessarily rough and preliminary in its details. The intended purpose was not to provide a comprehensive analysis of a fully-formed, field-ready development intervention. Such a task requires a project in its own right, replete with both quantitative and qualitative evaluations of feasibility that adequately take into account the full set of risks and contingencies that local participants face through engagement in the proposed program. Rather, the purpose of this exposition was to demonstrate that an equitable participatory approach to development makes possible new configurations of existing interventions and techniques, and requires a reevaluation of the objectives of development initiatives. Equitable participation necessitates a comprehensive strategy that charges individuals with taking a direct role in improving their lives. This will be an immensely difficult enterprise – one for which many may not be up to the task as of yet. Rising to the challenge will be the great work of this generation of developing communities and practitioners.

Tables and Figures

Table 1: Top 10 recipient countries of ODA from the U.K and France, 2005-2011¹⁴⁹

United Kingdom							
	2005	2006	2007	2008	2009	2010	2011
1	Nigeria	Nigeria	India	Iraq	India	India	<i>Ethiopia</i>
2	Iraq	India	<i>Ethiopia</i>	India	<i>Ethiopia</i>	<i>Ethiopia</i>	India
3	India	Afghanistan	Nigeria	Afghanistan	Afghanistan	Pakistan	Afghanistan
4	Tanzania	Tanzania	Afghanistan	Pakistan	Sudan	Nigeria	<i>Congo, Dem. Rep.</i>
5	Afghanistan	Sudan	Bangladesh	Tanzania	Bangladesh	<i>Congo, Dem. Rep.</i>	Bangladesh
6	Bangladesh	Uganda	Tanzania	<i>Ethiopia</i>	<i>Congo, Dem. Rep.</i>	Tanzania	Pakistan
7	Sudan	Pakistan	Sudan	Bangladesh	Pakistan	Afghanistan	Nigeria
8	Zambia	Iraq	Pakistan	Sudan	Tanzania	Bangladesh	<i>Mozambique</i>
9	Ghana	<i>Serbia</i>	Uganda	<i>Mozambique</i>	Nigeria	Uganda	Tanzania
10	Malawi	Malawi	<i>China</i>	<i>Congo, Dem. Rep.</i>	Ghana	Ghana	Sudan

France							
	2005	2006	2007	2008	2009	2010	2011
1	<i>Nigeria</i>	<i>Nigeria</i>	<i>Iraq</i>	Mayotte*	Cote d'Ivoire	Congo, Rep.	<i>Congo, Dem. Rep.</i>
2	Congo, Rep.	<i>Iraq</i>	Cameroon	Congo, Rep.	Mayotte*	Mayotte*	Cote d'Ivoire
3	<i>Iraq</i>	Mayotte*	Mayotte*	<i>Iraq</i>	<i>China</i>	<i>China</i>	Morocco
4	Algeria	Morocco	Morocco	Lebanon	Morocco	<i>Indonesia</i>	<i>Mexico</i>
5	Mayotte*	Senegal	Mali	<i>Turkey</i>	<i>Indonesia</i>	Morocco	Tunisia
6	Morocco	Cameroon	Algeria	<i>China</i>	Tunisia	Vietnam	<i>China</i>
7	Tunisia	Tunisia	Senegal	Senegal	<i>Turkey</i>	<i>Liberia</i>	<i>Turkey</i>
8	Senegal	Algeria	Vietnam	Vietnam	Vietnam	<i>Mexico</i>	Vietnam
9	<i>China</i>	Vietnam	Madagascar	Morocco	Senegal	<i>Philippines</i>	<i>Colombia</i>
10	Vietnam	<i>South Africa</i>	<i>Turkey</i>	Tunisia	Wallis & Futuna*	Togo	Senegal

Bold countries indicate former colonies, protectorates, or mandates of the respective European empire. *Italicized* countries were not part of the empire in question.

*Mayotte and Walls & Futuna are both still administered politically as French territories.

¹⁴⁹ Organisation for Economic Co-operation and Development, and Development Assistance Committee, *Geographical Distribution of Financial Flows to Developing Countries Disbursements, Commitments, Country Indicators*. 2013.

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