

# NATURAL GAS AND SOCIO-ECONOMIC TRANSFORMATION IN MOZAMBIQUE: SOME PRELIMINARY EVIDENCE

*Pedro Uetela and Franklin Obeng-Odoom\**

Although long known to hold energy reserves, it was not until the beginning of the 21<sup>st</sup> century that the extent of Mozambique's natural gas resources came to light with the discoveries of massive fields. Correspondingly, there was great optimism that the development of the country's hydrocarbons would prove transformative. Despite the fact in 2013 of a supergiant gas discovery made in Mozambique that is considered to be the second largest gas find in the world, the African nation has struggled to benefit from this significant resource and translate it into greater developmental achievements for the larger population. Additionally,

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\*Pedro Uetela, a CAPES (Coordination for the Advancement of Higher Education Staff Personnel) fellow scholar and Ph.D. candidate in social sciences at the Paulist State University, SP-Brazil, earned a *licenciatura* degree in Philosophy from the Pedagogic University of Mozambique, a master's degree in Education Management and Leadership from the University of Sydney (Australia), and a diploma in higher education studies and development through the exchange program between Oslo-Norway and Eduardo Mondlane-Mozambique Universities. His research interests have focused on development, specifically in the African continent, higher education, and the economic growth nexus in Africa along with research methods and statistics in social sciences. The author's recent publications have appeared in the *International Journal of Sociology of Education* and *Higher Education and Development in Africa* (London: Palgrave, 2016).

Franklin Obeng-Odoom is an Academician of the Ghana Academy of Arts and Sciences. He is the author of three books, including *Oiling the Urban Economy: Land, Labour, Capital and the State in Sekondi-Takoradi, Ghana* (London: Routledge, 2014) and *Reconstructing Urban Economics: Towards a Political Economy of the Built Environment* (London: Zed, 2016). He is based at the School of Built Environment, University of Technology Sydney, Sydney, NSW, Australia.

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this gas find is so sizeable that it is estimated that there is enough gas to fuel South Africa for 150 to 200 years on its own.<sup>1</sup> In essence, Mozambique's natural gas has the potential to be a true game changer, not just for the nation itself, but also for meeting Africa's regional energy needs. Yet the potential for squandering this opportunity is a concern for many who fear that Mozambique may travel down the same path of other commodity- and oil-rich African states that have failed to invest the returns of a non-renewable resource into the renewable resource of its own populace. Echoing this concern was the April 11, 2014 Radio France International broadcast that asserted the discovery of natural gas in Mozambique neither benefited the local population nor contributed to the economic growth of the country, considered to be one of the poorest states in Sub-Saharan Africa.<sup>2</sup> The argument seems to be in line with what P. Uetela emphasizes as a lack of involvement and empowerment of the population, which is fundamental for growth and change in Mozambique.<sup>3</sup> The assumptions also are linked to the well-publicized Radio France International broadcast suggesting there has been a failure to invest the revenues from natural resources into other key sectors such as education, infrastructure, industry, and agriculture. If this situation is not corrected, the broadcast claimed, the gas industry would perpetually lead the country to higher levels of poverty—a situation akin to that of Angola, Chad, and Nigeria, where natural resources have contributed to continuous strife and civil wars. Indeed, in her contribution to the *Journal of Democracy*, E. Azevedo-Harman, a member of the Scientific Council and Professor at the Catholic University of Mozambique, recently noted that “Mozambique, as it appears, has joined the ranks of those countries that live in severe poverty while the spectre and promise of wealth loom before them.”<sup>4</sup> In contrast, the few studies on the gas sector suggest that it has been growth enhancing (M. Parker and H. Kreuze, G. Melina and Y. Xiong, and J. Demierre et al.), in spite of concerns by others about transparency (see, for example, the works of D. Nombora).<sup>5</sup> In turn, one wonders what kinds of transformation have been sparked by the natural gas industry in Mozambique.

Recent discoveries of natural gas in Africa have generated much attention for the continent and animated the debate about the precise impact of fossil fuel development on the economy, society, and environment. While the ramifications of such discoveries for the mature and declining resource economies of Nigeria, Gabon, and Chad, among others, have been extensively discussed (e.g., J. Heilbrunn), many questions have been asked of the emerging producers such as Mozambique.<sup>6</sup> Most questions are framed around the “resource curse” thesis, which emphasizes whether gas resources will enhance or limit economic growth. Or, in its classical formulation, whether using windfall revenues for social services is good for society and the economy given that such social expenditures are unsustainable.<sup>7</sup> It is in this heated debate that the Mozambican authorities have found themselves. Should the state intervene or allow the market to operate and the people to

find their own “level” in this “free” market process? Should gas be regarded as a mere export earner or should it be used to promote linkages and industrialization?<sup>8</sup> As one of the poorest countries in Africa, the “Mozambican resource dilemma” requires urgent attention and consideration.

However, it is useful to step back and examine how questions of resource impacts are framed. What if, instead of utilizing the “resource curse” framework, we use a different framework, one which recognizes that in a resource abundant economy there can be both propitious and deleterious outcomes? What if, instead of studying only growth, we study socio-economic transformation? This revised analytical frame has been used elsewhere in Africa (F. Obeng-Odoom) and, in the case of Mozambique, at least J. Kirshner and M. Power have suggested that such new questions hold much promise.<sup>9</sup> In turn, they considered not only the “resource curse” but a triad of infrastructure networks, enclave spaces developed by resources, and resulting urbanization. Authoritative reviews of the literature (see, for example, T. Kinnaman and J. M. Barth) show that this more “hands-on,” fluid, and institutionalist approach has much backing in the global literature, given the complexities of the effects of gas development on the economy, society, and environment and the information paucity that can plague nascent resource economies.<sup>10</sup> This approach has the added advantages of breaking away from the strictures of the neoclassical economics framework of the “resource curse.”

The aim of this article is to extend the state of analysis on the impacts of gas development in Mozambique by evaluating the relationship between the gas sector, the Mozambican economy, and social change. As the resource curse framework is only limited to economic growth, this work utilizes two alternative frameworks—the Staples approach<sup>11</sup> and the Linkages approach<sup>12</sup>—that are melded into an institutional analysis, looking simultaneously at “benefits, costs, and uncertainties”<sup>13</sup> or “blessings, uncertainties, and curses,”<sup>14</sup> and used to conceptualize progress more widely to include not only growth, but other externalities and broader social change as applied to the case of Mozambique.

In so doing, the evidence suggests that the natural gas industry in Mozambique has contributed to both the expansion in economic growth and social change. However, the positive experience with social change arises from direct intervention and not necessarily the result of the related economic growth. Indeed, in the process of economic growth, the production and export of natural gas in Mozambique have raised the possibility of major socio-economic and ecological dangers. Contrary to the theoretical criticism of spending windfall revenues on social services as wasteful,<sup>15</sup> we argue that only strategic social and ecological expenditures of gas revenues can provide and increase the chances of the gas industry becoming transformational economically, socially, and ecologically.

The article is organized as follows; the next section deals with conceptualizing the paper and describing the sources of data. This is followed by sections that

present the results, a discussion of those results, and conclusions and policy implications from the study.

### *Methodology*

The way we understand resource experiences is heavily dependent on our disciplines and conceptual frameworks, which, in turn, influence our methods of data collection. There are multiple theoretical frameworks utilized by diverse disciplines such as sociology (A. Giddens, R. Freudenburg, and D. Davidson and R. Dunlap), the field of anthropology (T. Richardson and G. Weszkalnys, F. Boas, and A. Radcliffe-Brown), economic geography (M. Arias et al.) and those with foundations in economics.<sup>16</sup> Classified according to orientation, however, three main approaches to understanding resource impacts have been used across these disciplines. They range from resource curse to the enclave thesis to social disruption.

The most common approach is the resource curse framework. Underpinning this concept is the expectation that a resource boom usually leads to many economic (e.g., inflation, deindustrialization), social (e.g., corruption, conflict), and environmental (e.g., pollution, destruction of natural habitat) problems. It used to be most commonly utilized by classical economists and later by neoclassical academics and professional economists for whom the key concerns were economic issues related to economic growth. However, the adoption and adaptation by other social scientists have broadened the resource curse framework to include questions of ecology and distribution (see, for economic explanation, M. Bordo and J. Cairnes, *The Economist*, W. Corden and P. Neary, and X. Sala-i-Martin and A. Subramanian, and for a broader explanation, J. Goodman and D. Worth and F. Obeng-Odoom).<sup>17</sup>

The enclave and social disruption thesis can be regarded as similar in many respects to that of the resource curse in the sense it too posits a negative relationship between resource booms and socio-economic and environmental ills as M. Lawrie et al. state.<sup>18</sup> That being said, the mechanisms by which the negative experience is established vary. Enclave analysts tend to stress economic processes, typically noting that resource booms generate benefits but that these are concentrated only in one aspect of the economy without supporting other economic sectors. Social disruption theories offer more sociological-based explanations about community and societal breakdowns due to sudden changes and anti-social behavior induced by resource booms. W. Freudenburg has been identified with this theory.<sup>19</sup>

Over the years, these frameworks have been found to have limitations. A common criticism of all is that they are quite insular, focusing mainly on the nation-state rather than the nation-state as part of the world system in which capitalism is the ruling mode of production. As a result, external factors and drivers of "impacts" have tended to be overlooked. Also discounted, especially in

the dominant resource curse framework, are the diversity, difference, and differentiation of impacts for property relations over different time periods during which resources are emerging, maturing, or declining. The binary choice of “blessing” or “curse” oversimplifies the analyses demonstrated by M. Lawrie et al. and F. Obeng-Odoom.<sup>20</sup> According to L. Fioramonti, these criticisms tend to lead to broader (e.g., introducing a temporal dimension) but similarly growth-centric alternatives, which makes this framework inappropriate for use in Africa, a continent where growth has bypassed the majority of people and is particularly inappropriate.<sup>21</sup> An alternative, embracing important aspects of some of these frameworks while eschewing their confounding features, is required. Such a framework should make contradictions central to explanation and be sensitive to tensions—locally, nationally, and internationally—while taking into account the nature of the underlying economic system.<sup>22</sup>

As F. Cooper has recently advocated, in studying Africa the continent’s place in the capitalist system and the world ought to be part of the analysis.<sup>23</sup> Regulatory approaches also may contribute to the analysis. Specifically, this approach simultaneously relates “benefits, costs, and uncertainties”<sup>24</sup> or “blessings, uncertainties, and curses”<sup>25</sup> to (a) examine why capitalism persists in spite of inherent and severe crises, (b) explain why oil and gas remain core to capitalism in spite of all the interest about developing alternative fuels, (c) demonstrate the centrality of the wage relation or workers and their relationship to capitalists to the continuing dependence on oil (how work is separated from home and, hence, how workers become dependent on the automobile), and (d) the centrality of ecological crisis in capitalism.<sup>26</sup> While used to great success in the United States,<sup>27</sup> in the Mozambican case information about the gas industry is so sparse<sup>28</sup> that, at this stage, there are not enough data to do a careful Marxian analysis.

Given these circumstances, a descriptive-prescriptive framework can work better. The best methodology for the gas sector will be to combine the Staples approach pioneered by Innis and the linkages approach developed by Hirschman. Innis’ Staples thesis, widely discussed by M. Watkins, is one effective way to explain the oil-growth-socio-economic transformation nexus.<sup>29</sup> The key features of this approach entail carefully studying the specific characteristics of oil as a resource, knitting these into the fabric of impacts, and cautiously describing how these characteristics and impacts are related and combined and, thus, how these can be taken into account in oil policy making.<sup>30</sup> In this approach, the analyst looks for characteristics of the resource and then tries to establish the spread effects of the oil and gas sector, which stimulate the growth of interlinked industries to supply inputs (backward linkages) and make use of outputs from the oil industry (forward linkages). From this perspective, oil production unleashes economic effects that link together booming and lagging sectors to improve the overall social conditions of the oil economy.<sup>31</sup> The oil and gas industries tend to stimulate a wide range of economic activities that, in turn, additionally are carried out to process the

outputs of the oil industry. In practice, “the most important example of backward linkage is the building of transport systems for collection of the staple, for that can have further and powerful spread effects.”<sup>32</sup>

These activities employ a large work force whose purchases and taxes further enhance economic activities and generate revenues for the state. Most of such activities require energy to run and, hence, they boost the demand for oil and other energy sources. All these lead to a process that tends to drive economic growth as P. Alagidede observed.<sup>33</sup> However, beyond growth, the process is economic development-inducing because it generates outcomes that can be diffused in the economy for inclusive progress. Despite this, even if the activities do not impact substantial aspects of the economy, Staples analysts would argue that revenues from backward and forward linkages can be invested in social and economic support services to spread the benefits of economic growth.

A. Hirschman et al. furthered this idea of interdependent economic processes into a stronger concept of “linkages.”<sup>34</sup> Hirschman considered Innis’ effort too “descriptive” because the industrial linkages form a bridge from underdevelopment to economic development through unbalanced but sequential industrialization. In both the 1958 and 1984 Hirschman works the argument put forth is that the economic development process is set in motion by industries that trigger a series of interdependent activities leading to linkages—either forward or backward—with a preference for the establishment of industries that had the potential of unleashing further industrialization.<sup>35</sup> It is not surprising that the construction and infrastructure industries were favored because of their ability to augment capital formation and generate revenues. Hirschman’s later work encouraged linkages analysis, particularly fiscal linkages, to enable the state to obtain revenues for re-investment in other linkage-generating industries.<sup>36</sup>

Backward linkages are those inputs and support facilities that are constructed to serve the oil industry, so Hirschman called them “input-provision effects.”<sup>37</sup> In this sense, economic processes such as construction of roads, housing, hospitals, and hospitality facilities are all considered backward linkages. Forward linkages, on the other hand, are those facilities for which the oil sector provides inputs. In Hirschman’s words, they are “output-utilisation effects.”<sup>38</sup> Such facilities are accompanied by construction-related activities of their own. For instance, refineries that are set up come along with housing for the refineries staff. Other small industries may be built to support refinery operation. Some of these construction activities are related to the backward linkages but others are distinct. Industries that support oil drilling may differ from those set up to utilize oil products, but they are both related to the ramifications that oil development has on the economy.

The approach adopted here gives a more positive role to the state. Unlike the neoclassical approach in which the state is encouraged to pursue only monetary and fiscal policies<sup>39</sup> or simply allow the market to flourish,<sup>40</sup> this approach

encourages a greater role for the state aimed at driving inclusive economic development.

The data used for the analysis are secondary. They are derived from reports prepared by independent analysts, the government, and the gas company. They are taken from a variety of documents such as national plans, official releases, and speeches.

### ***Results***

According to the Capstone Report, the discovery of natural gas in Mozambique goes back to the early 1960s although it was only in the 2000s that its development began in earnest in the southern province of Inhambane.<sup>41</sup> Gas production began in 2004 and, despite its sizeable reserves, the nation is still deemed as an emerging gas producer.<sup>42</sup> There are three reasons that have been offered by D. Ledesma for the recent successful discovery of gas in Mozambique and other countries: technical, economic, and political factors.<sup>43</sup> Technically, more advanced science and technology has now been developed. Economically, the demand for fossil fuel coupled with growing insecurity in the countries traditionally associated with gas production makes Africa a solid production choice. Politically, the improved situation on the continent and, in particular for Mozambique, which had suffered from war and civil strife in the 1970s and 1980s, has led to new discoveries. Following the Mozambican civil war, which intensified during the mid- and late 1980s, the political situation on the ground stabilized, thus paving the way for more serious and sustained energy exploration.<sup>44</sup>

As a result, the last two decades (1995–2015) have seen more external investor interest in Mozambique. There are two additional reasons for this recent successful gas development. First, the emergence of Sasol Limited<sup>45</sup> company in 2002 in Temane-Inhambane city, a region possessing an estimated 3.5 trillion cubic feet (tcf) of reserves of natural gas, and, second, the joint development efforts by both U.S. and Italian companies, namely, Anadarko Petroleum Corporation<sup>46</sup> and Eni,<sup>47</sup> respectively, which are responsible for the current discoveries in the Rovuma basin in the northern city of Mozambique-Pemba.<sup>48</sup>

To date, the two leading companies have produced an estimated 4.200 billion cubic meters (bcm) of natural gas in the Rovuma basin alone. This record confirms the findings in the SPTEC Advisory country report that Mozambique could become the world's third largest exporter of liquefied natural gas (LNG) based on assessments by Anadarko Petroleum Corporation.<sup>49</sup>

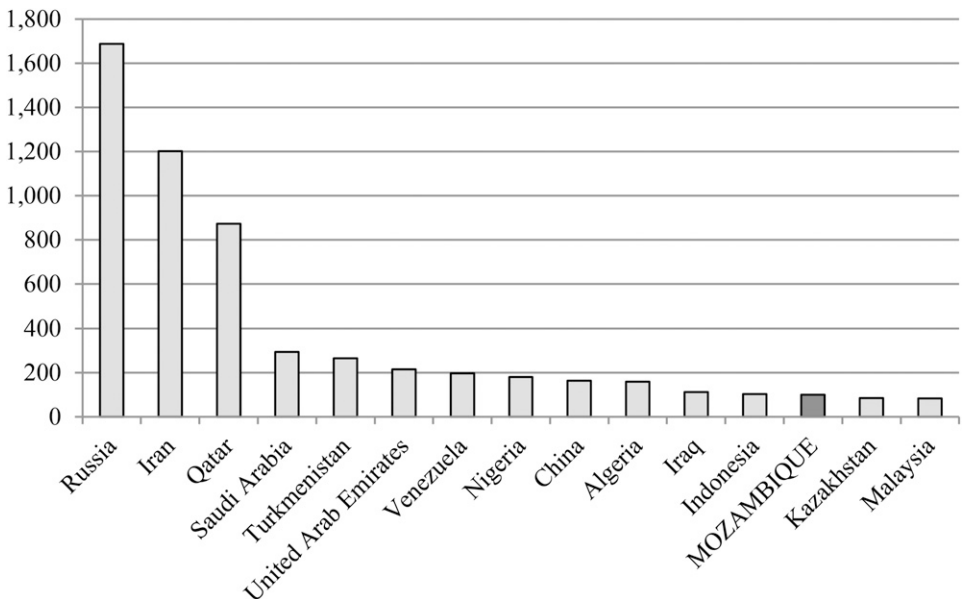
Moreover, the dominant global concern about Mozambique is that, once its gas reserves are fully developed, the nation could be positioned as one of the largest producers of LNG in Africa. Based on natural gas reserve estimates, by 2012

Mozambique was being hailed as the emerging new giant in natural gas.<sup>50</sup> This was the period when Anadarko Petroleum Corporation and Eni announced a 100-tcf natural gas discovery with an additional 150 tcf potential, increasing the number to a staggering 250 tcf of both potential and already discovered reserves. Thus, the prospects of Mozambique becoming a significant natural gas producing hub in Africa are high. Figure 1 highlights Mozambique's position relative to other nations based upon proved natural gas reserves. It shows that Mozambique ranks 13th in a list of the top 15 global gas reserve holders according to 2015 figures from the U.S. Department of Energy's Energy Information Administration.

Thus, Mozambique holds quite a prominent position in the league of gas producers. Figure 2 is an annotated diagram showing the geographical location of major gas-producing areas in the country. These are mainly located in Temane-Inhambane in the south and Rovuma in the north.

Investment related to natural gas is anticipated to be sizeable in Mozambique. For the next decade, investment in natural gas is expected to be \$66 billion and

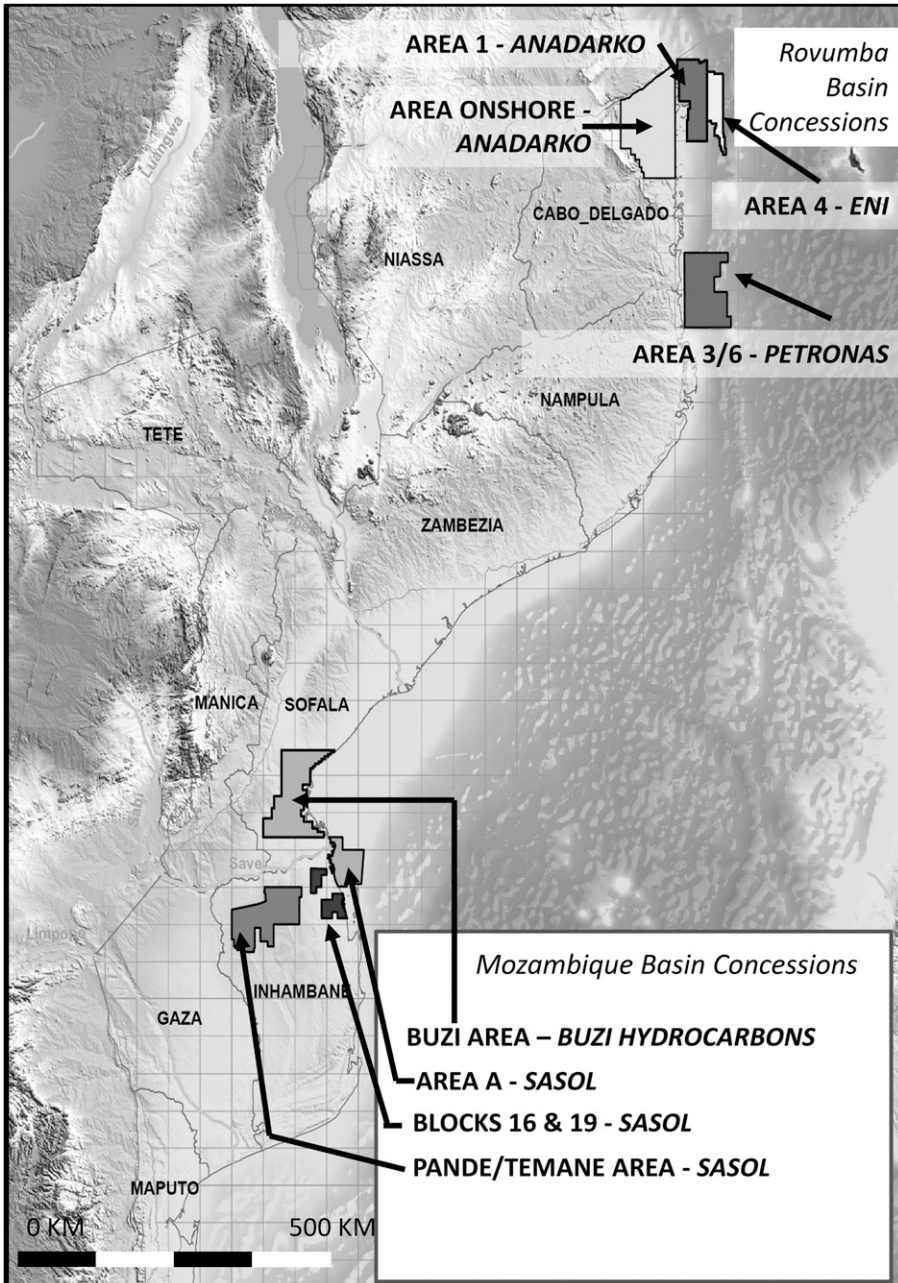
Figure 1  
MOZAMBIQUE IN THE TOP 15 NATIONS BASED UPON PROVED NATURAL GAS  
RESERVES, 2015  
(proved reserves of natural gas in trillion cubic feet–tcf)



Source: U.S. Energy Information Administration, *Proved Reserves of Natural Gas 2015* (Washington, D.C.: U.S. Department of Energy, Energy Information Administration, 2016).



Figure 2  
GENERAL DISTRIBUTION OF NATURAL RESOURCES IN MOZAMBIQUE



Source: National Petroleum Institute of Mozambique, "Map of Concessions" April 8, 2016, available at <http://www.inp.gov.mz/pt/Mapas/Mapa-de-Concessoes>.

between \$200 and \$400 billion over the next four decades.<sup>51</sup> Thus, given the magnitude of these investments, there are some important prospects both from an economic and societal perspective that require further discussion.

### *Discussion*

The discovery and proliferation of new reserves have proven to be a potential driver for economic growth in Mozambique; however, there seem to be different figures for the precise contribution of the gas sector to the national economy. For example, the United Nations Development Program (UNDP) reports that in the year 2000 total receipts in taxes from the hydrocarbon industries in Mozambique was about \$24 million, which ranged between 1 to 2 percent of total national revenue of the country. In 2009, the gas companies paid a similar amount in taxes. The contribution of the gas industry to gross domestic product (GDP) was 1 to 1.7 percent around 2012/early 2013 and was expected to increase to 13 percent over the following six years.<sup>52</sup> Some limited evidence suggests that the increase is a possibility: “in 2013, contracts to explore the Rovuma region for gas were bringing the government in Maputo an amount worth more than 4 percent of GDP.”<sup>53</sup> The resource specialists in the country predict that Mozambique is likely to obtain revenues of some U.S. \$115 billion from gas exports between 2020 and 2040 alone, subject to further technical work by the gas companies.<sup>54</sup>

According to the Mozambican Ministry of Natural Resources, the industry will contribute 13 percent to the GDP of the country in the next few decades.<sup>55</sup> Furthermore, the Capstone Project highlights that the commercialization of gas already has led to a 7.5-percent increase in the GDP of the country and boosted financial activity, commerce, communication, transport, and construction.<sup>56</sup> It appears that the gas industry was key in enabling the country as a whole to reach a 7.2-percent average growth in a 10-year period.<sup>57</sup> Others seem to corroborate the figures offered by the Capstone Project. For instance, M. Parker and H. Kreuze note that “Mozambique has shown high annual GDP growth rates in the last years with an average of 7.2% between 2001 and 2011 *due to its low starting level and its large natural resource endowment*” [emphasis added].<sup>58</sup> These figures are clear evidence that the gas reserves not only benefit the inhabitants of the main cities where gas is being developed but also the country as a whole—even if the levels of that benefit vary.

Indeed, economists in the country<sup>59</sup> seem to dispute many of these figures, signaling that the Mozambican “growth story” is still a cautionary tale. Elsewhere in Africa, similar questions about GDP calculations have been raised but so, too, have questions about the social processes that lead to GDP expansion and those experiences that are excluded from GDP calculations as F. Obeng-Odoom observed.<sup>60</sup>

Currently, the preliminary evidence in Mozambique suggests that ecological degradation and social marginalization are quite central to the same process of

accumulation that generates growth. One hundred thousand people have been displaced but it appears that the process of compensation and resettlement has been effective to date with the endorsement of civil society groups, although it is still unclear as to how the people who have been resettled actually feel about the process.<sup>61</sup> Nevertheless, there remain socially precarious challenges to be addressed.

While a few women have found some jobs in gas-related activities, most seem to have been particularly disadvantaged in this growth success. This is brought into sharp focus because the *Draft Natural Gas Master Plan* pays some attention to environmental concerns, but no attention to gender-related impacts.<sup>62</sup> In many cases, the global oil and gas industry is viewed as undermining and marginalizing women by exploiting their domestic labor to support men. In turn, when men celebrate economic windfalls, women tend to only witness greater dependence as they lack access to the industry or, when they access it, they are made to feel inferior or given limited support relative to men.<sup>63</sup>

These are particularly worrisome because of the absence of (a) regulations, (b) formal regulatory agencies to implement and monitor regulations, even when the regulations are enacted, and (c) civil society groups and media networks that will hold actors to account, publicize any mishaps, and give voice to persons and groups who might miss out of the industry.

From an economic perspective, while the domestic demand for gas in Mozambique is expected to increase, it is currently quite small. As of 2011, it was only 0.5 billion cubic meters per year and most of this demand arose from Maputo and Beira.<sup>64</sup> Therefore, it appears that the linkages arising from gas have been rather weak.

These issues require direct policy attention. International evidence from Brazil shows that merely assuming greater economic growth will have a “trickle down” effect that naturally address these concerns is unlikely to work. In analyzing the experience of Brazil, F. Fernandes once argued that industrializing the country would eradicate social inequalities.<sup>65</sup> However, numerous studies published in the *Brazilian Journal of Political Economy* have shown the opposite: the more the country has industrialized, the worse social inequalities have become.

Political economists tend to argue that the social economy requires direct support. Certainly, in the case of Mozambique, even the meagre U.S. \$1 million (on average) that the hydrocarbon company of Mozambique has been investing in social projects in gas-producing regions has yielded notable results. This is supported by the evidence that companies such as Sasol have initiated investments in corporate social projects estimated at U.S. \$13 million, and primarily focuses on infrastructure development with 67 percent.<sup>66</sup> Additional fields of Sasol’s corporate investments with special emphasis for social projects include provision and maintenance of schools, health clinics, water boreholes, and water systems. The company has set as its main goal to leverage skills development, education, and

capacity building of the citizens through the education value chain—this is outlined by both Sasol and Mozambique LNG as components of their social investment programs in the country.<sup>67</sup> Even though there are additional social investment plans for improving health facilities, community investment programs, regional development initiatives, and philanthropy, history has shown in that in hydrocarbon-rich environments it has often been difficult to translate these types of programs into longer lasting and self-sustaining gains.

*The Natural Gas Master Plan for Mozambique* summed up the impact of natural gas on social development in the country as follows:

Natural gas resources are developed in a manner that maximizes benefits to Mozambique society by supporting: growth in domestic public and private sector institutional competencies; growth in domestic industry and business, especially small and medium scale industries; increased employment across the country especially in the less developed provinces; infrastructure to support expanded economic activities especially in less developed provinces; and expand access to training and education in order to improve the quality of life for the people of Mozambique; while minimizing adverse social and environmental impacts.<sup>68</sup>

In addition, the same report provides an overview of the scale of local gas use, which is still very low in relation to the overall gas supply:

Raw gas is processed through the central processing facility (CPF) in Temane with a capacity of about 147 million GJ per year (about 400,000 GJ/day). A small distribution network was developed in Inhambane province, providing gas supply to several localities totaling less than 200,000 GJ per year (about 550 GJ per day). In 2010, production from Temane was 125 million GJ, of which 118 GJ were exported.<sup>69</sup>

Those are some of the social benefits of gas development and there are others worth mentioning. Currently, 50 percent of gas produced in Mozambique is exported to South Africa in return for foreign exchange, while the remainder is consumed domestically to meet local energy needs.<sup>70</sup> In addition to consuming natural gas directly, it can be used for electricity generation. On December 12, 2014, the national radio of Mozambique reported that the National Hydrocarbon Company of Mozambique (ENH) was offering natural gas to the Electricity Company of Mozambique (EDM). The electricity company uses this natural gas to produce power, which tends to benefit urban dwellers, especially those in cities such as Maputo, Inhambane, and Pemba, but has the potential to be more widely consumed. An estimated 400 families have reportedly benefitted from other projects initiated by the ENH, particularly in Temane-Inhambane city, one of the sites where the first reserves were discovered in southern Mozambique. The ENH, in coordination with the companies that produce gas in Mozambique, has developed other social projects in areas where natural gas has been discovered, contributing to the development through education, health services, and access to water and sanitation.

Together, the evidence may serve as a reminder of what direct positive intervention can do, but it may not be the complete story. We do not yet know what local residents think of the gas company, whether the company incorporates the views of local residents, and in what ways livelihoods have changed since the start of gas production. Employment in the industry remains extremely low, increasing from 2 to 22 workers in the last 13 years at the Mozambican Hydrocarbon Company. Some 3,800 jobs generated in the industry are from five of the leading gas projects only. Taking into account the employment in the industry as a whole, it seems the total number of jobs in the gas sector will be only 6,000 in total—a reminder that this sector is considered to be more capital intensive in nature and not labor intensive.<sup>71</sup> These are matters that warrant a fuller assessment of “accumulation by dispossession” and, hence, will engage the attention of future researchers.<sup>72</sup>

There are other topics that require further research. Energy provision is one such area of emphasis. The gas industry can help meet the domestic energy needs in five ways. First, the cost of energy might fall over the years so that people will spend less on energy and, thus, result in substantial savings. Second, access to energy is expected to expand to populations that hitherto did not have regular and affordable access. Third, overall industrial activities are expected to benefit by obtaining more reliable energy access and paying less for energy, thereby producing more in output. Fourth, the government is expected to spend less on energy subsidies that, in turn, would increase potential revenues for expenditures on other social services. Indeed, through the export of energy, the government can obtain more revenue to invest in the education and health sectors.

However, experiences from the North African gas sector show that Mozambique will have to tread cautiously in separating gas from other energy sources. Its energy policy can integrate the various energy sources to provide a mix of energy options. Questions about gas pipeline disputes, increasing domestic use, subsidies and how they can lead to the sale of gas elsewhere for a profit, and the possibility that suppliers, instead of investing in Mozambique, would prefer to sell outside for a greater profit are all areas that require further study. An alternative model that could be studied is that of the Kingdom of Saudi Arabia’s no export/no import gas policy and the implications for such a policy in the case of Mozambique, which would curtail the development of gas for local use only.<sup>73</sup>

### ***Conclusion and Policy Implications***

While the gas industry seems to have contributed to driving growth and social development, the linkages between the industry and the rest of the economy or the processes of economic development are quite weak. At present, there is no guarantee that social inequalities will be attenuated through gas projects. The lack

of clear policies against exploitation is a major challenge as is the lack of guidelines to shape the relationship among donors, investors, and local authorities.

However, were it willing, the state could do more. While it has provided a local content law and imposed a quota on foreign employees (Decree No. 63/2011) to enhance the employment prospects of locals,<sup>74</sup> evidence from elsewhere in Africa<sup>75</sup> shows that such jobs can be (a) few, relative to expectations; (b) beneficial only to people who live far away from the realities of local residents and create a transient work force with much antagonism between such workers and local residents; (c) precarious and menial; and (d) biased in favor of men. In such cases, widespread inequalities are likely to develop among Mozambicans and between those Mozambicans who work in the industry and the minority expatriate workers. The Mozambican authorities can go even further not only in defining but also in implementing and monitoring a gender-sensitive resource-based job creation, developing an employment model that progressively increases the power and control of workers in terms of the nature of their participation in the production process, decision making about allocating economic surplus, and responsible financial management roles.<sup>76</sup>

The energy companies can contribute more in a revised policy orientation. While Mozambique currently has a petroleum production tax (pegged at 6 percent of the value/price of the gas in the month in which it is produced) and royalty regimes (pegged at 2 to 15 percent of the value of gas, the specifics determined by the Council of Ministers), the 5-year exemptions (fiscal benefits to attract investors to Mozambique) granted to gas companies can be amended to enhance the revenue stream of the national government.<sup>77</sup> Taxes can be levied on windfalls and the rents accruing to landlords whose properties appreciate in value arising from social investments, population growth, and speculation. The advantage of this land tax, often called a "Georgist tax," is that it will remove or ameliorate spatial, wealth, and income inequalities, discourage speculative behavior, and generate public revenues that can be directed toward social programs. Such a policy has been used for propitious ends in the United States and elsewhere.<sup>78</sup> However, Mozambique needs to be cautious in the implementation process as there is no guarantee that what worked in the United States might also be effective in this context.

It is also possible, if not desirable, for the authorities to develop the country's refining capacity. Currently, Mozambique imports all its refined oil products, including gasoline. In 2011, this import bill amounted to over \$870 million, so if it develops its refinery capacity the country can make major savings and generate more gas to be refined for use locally or for export. These advantages are echoed in the plans of Oilmoz to develop a refinery near Maputo. It is estimated that this planned refinery will generate 17,000 jobs during its construction phase (15,000 temporary jobs) and when the facility is operational (2,000 permanent jobs). Another refinery, Ayr Petro Nacala Refinery, is also to be developed with the help of the Saudi authorities.<sup>79</sup> These refineries are likely to generate further linkages.

On the entire African continent, there are only 44 refineries and, apart from Kenya and South Africa, there appears to be no major refinery in the Southern and Eastern African regions.<sup>80</sup> So, the development of these refineries can create linkages not only within but also between Mozambique and the rest of Africa and the world, preparing the grounds for energy democracy and self-sufficiency.

A fourth area in need of policy attention is the environment, which is critical at every stage in the process be it in exploring for more gas, storage, transport, or sale. Even in refining, residents in refinery towns encounter greater negative externalities and environmental pollution, as many international studies have shown.<sup>81</sup> Yet, in Mozambique, environmental aspects have tended to be pigeon-holed into “environmental impact assessment” and rules applicable at the start of gas projects.<sup>82</sup> While some of these lines of enquiry and policy making may look utopian, the dystopian reality of the status quo will not deliver on key goals either.

The contradictions of resource development in the Mozambican case be they “benefits, costs, and uncertainties”<sup>83</sup> or “blessings, uncertainties, and curses”<sup>84</sup> play out in bouts of accumulation and troughs of marginalization. The pressures are limited at this stage, but they might be attenuated by promoting strong state-led intersectoral linkages and connections among economy, society, and the environment. In doing so, the specific characteristics of gas as an exhaustible natural resource must be taken into account for long-term future planning. It is early days yet to see how the Mozambican authorities will work this out, but much will also depend on an alert media and civil society groups focusing not only on the nation-state, but also on the underlying mode of production and the interconnections with the world system. The task is to seek reasonable accumulation without dispossession or limited and declining dispossession in a regime oriented to growth and change, social progress, and energy sufficiency.

#### NOTES

<sup>1</sup>Dube, Tendai, “How Mozambique Can Benefit More from Its Massive Gas Discovery,” *CNBC Africa*, August 24, 2015.

<sup>2</sup>Rádio França Internacional, “Moçambique Descobertas de gás e carvão ainda não beneficiam a população,” April 11, 2014, available at <http://www.portugues.rfi.fr/africa/20140411-mocambique>.

<sup>3</sup>P. Uetela, “Moçambique: Encontros e Desencontros nos Mecanismos de Democracia Participativa Escolar,” *Revista Movimentação*, vol. 1, no. 1 (2014), pp. 18–31 (see pages 27–8).

<sup>4</sup>E. Azevedo-Harman, “Patching Things Up in Mozambique,” *Journal of Democracy*, vol. 26, no. 2 (2015), p. 144.

<sup>5</sup>M. Parker and H. Kreuze, *Angola and Mozambique Gas Monetization for Economic Development: Gas Based Industry Feasibility Study* (Tunis, Tunisia: The African Development Bank and DNV KEMA Energy & Sustainability, June 30, 2012); G. Melina and Y. Xiong, “Natural Gas, Public Investment and Debt Sustainability in Mozambique,” IMF Working Paper no. WP/13/261,

Washington, D.C., International Monetary Fund (IMF), 2012; J. Demierre, M. Bazilian, J. Carbajal, S. Sherpa, and V. Modi, *Potential Regional Use of East Africa's Natural Gas* (New York: Sustainable Engineering Lab, Earth Institute of Columbia University, 2014); and D. Nombora, *Extractive Industries Transparency Initiative: Mozambique Moves towards Compliant Status* (Maputo, Mozambique: Centre for Public Integrity, 2012), and *Advances and Stagnation of Transparency in the Extractive Industry in Mozambique* (Maputo, Mozambique: Centre for Public Integrity, 2012).

<sup>6</sup>J. R. Heilbrunn, *Oil, Democracy, and Development in Africa* (New York: Cambridge University Press, 2014).

<sup>7</sup>*The Economist*, "The Dutch Disease," November 26, 1977, pp. 82–3.

<sup>8</sup>E. Aaboe and T. Kring, *Natural Resource Management and Extractive Industries in Mozambique: A UN Mozambique Study* (Maputo, Mozambique: United Nations, 2013), p. iv.

<sup>9</sup>F. Obeng-Odoom, *Oiling the Urban Economy: Land, Labour, Capital, and the State in Sekondi-Takoradi, Ghana* (London: Routledge, 2014), and J. Kirshner and M. Power, "Mining and Extractive Urbanism: Postdevelopment in a Mozambican Boomtown," *Geoforum*, vol. 61 (May 2015), pp. 67–78.

<sup>10</sup>T. Kinnaman, "The Economic Impact of Shale Gas Extraction: A Review of Existing Studies," *Ecological Economics*, vol. 70 (2011), pp. 1243–249, and J. M. Barth, "The Economic Impact of Shale Gas Development on State and Local Economies: Benefits, Costs, and Uncertainties," *New Solutions: A Journal of Environmental and Occupational Health Policy*, vol. 23, no. 1 (2013), pp. 85–101.

<sup>11</sup>H. Innis, *The Fur Trade in Canada: An Introduction to Canadian Economic History* (New Haven, Connecticut: Yale University Press, 1930).

<sup>12</sup>A. Hirschman, *The Strategy of Economic Development* (New Haven, Connecticut: Yale University Press, 1958).

<sup>13</sup>J. M. Barth, op. cit.

<sup>14</sup>F. Obeng-Odoom, "Problematising the Resource Curse Thesis," *Development and Society*, vol. 41, no. 1 (2012), pp. 1–29.

<sup>15</sup>*The Economist*, op. cit.

<sup>16</sup>A. Giddens, *Novas regras do metodo sociologico. Uma critica positiva das sociologias compreensivas* (Rio de Janeiro: Edicoes Sahar, 1978), and *Sociology. Fundação Calouste Gulbenkian. Serviço de educação e Bolsas* (Lisbon: Calouste Gulbenkian Editora, 2001); W. R. Freudenburg, "Addictive Economies: Extractive Industries and Vulnerable Localities in a Changing World Economy," *Rural Sociology*, vol. 57, no. 3 (1992), pp. 305–32; D. Davidson and R. Dunlap, "Introduction: Building on the Legacy Contributions of William R. Freudenburg in Environmental Studies and Sociology," *Journal of Environmental Studies and Sciences*, vol. 2, no. 1 (2012), pp. 1–6; T. Richardson and G. Weszkalnys, "Introduction: Resource Materialities: New Anthropological Perspectives on Natural Resource Environments," *Anthropological Quarterly*, vol. 87, no. 1 (2014), pp. 5–30; F. Boas, *Antropologia Cultural* (Rio de Janeiro: Jorge Zahar Editora, 2004); A. Radcliffe-Brown, *Antropologia* (São Paulo: Atica Editora, 1978); and M. Arias, M. Atienza, and



J. Cademartori, "Large Mining Enterprises and Regional Development in Chile: Between the Enclave and Cluster," *Journal of Economic Geography*, vol. 14., no. 1 (2013), pp. 73–95.

<sup>17</sup>M. Bordo and J. E. Cairnes, "On the Effects of the Australian Gold Discoveries, 1851–73: An Early Application of the Methodology of Positive Economics," *History of Political Economy*, vol. 7, no. 3 (1975), pp. 337–59; *The Economist*, op. cit.; W. Corden and P. Neary, "Booming Sector and De-Industrialisation in a Small Open Economy," *The Economic Journal*, vol. 92, no. 368 (1982), pp. 825–48; X. Sala-i-Martin and A. Subramanian, "Addressing the Natural Resource Curse: An Illustration from Nigeria," *Journal of African Economies*, vol. 22, no. 4 (2012), pp. 570–615; J. Goodman and D. Worth, "The Minerals Boom and Australia's 'Resource Curse'," *Journal of Australian Political Economy*, no. 61 (June 2008), pp. 201–19; and F. Obeng-Odoom, "Problematising the Resource Curse Thesis."

<sup>18</sup>M. Lawrie, M. Tonts, and P. Plummer, "Boomtowns, Resource Dependence and Socio-economic Well-being," *Australian Geographer*, vol. 42, no. 2 (2011), pp. 139–64.

<sup>19</sup>W. R. Freudenburg, op. cit.

<sup>20</sup>M. Lawrie et al., op. cit., and F. Obeng-Odoom, *Oiling the Urban Economy: Land, Labour, Capital, and the State in Sekondi-Takoradi, Ghana*.

<sup>21</sup>L. Fioramonti, *Gross Domestic Problem: The Politics behind the World's Most Powerful Number* (London: Zed Books, 2013).

<sup>22</sup>J. McNeish and O. Logan, *Flammable Societies: Studies on the Socio-economics of Oil and Gas* (New York: Pluto Press, 2012), p. 20.

<sup>23</sup>F. Cooper, *Africa in the World: Capitalism, Empire, Nation-State* (Cambridge, Massachusetts: Harvard University Press, 2014).

<sup>24</sup>J. M. Barth, op. cit.

<sup>25</sup>F. Obeng-Odoom, "Problematising the Resource Curse Thesis."

<sup>26</sup>M. Huber, "Fueling Capitalism: Oil, the Regulation Approach, and the Ecology of Capital," *Economic Geography*, vol. 89, no. 2 (2013), pp. 171–94.

<sup>27</sup>Ibid.

<sup>28</sup>D. Nombora, *Extractive Industries Transparency Initiative: Mozambique Moves towards Compliant Status*.

<sup>29</sup>M. Watkins, "A Staple Theory of Economic Growth," *The Canadian Journal of Economics and Political Science*, vol. 29, no. 2 (1963), pp. 141–58.

<sup>30</sup>Ibid; S. Mills and B. Sweeney, "Employment Relations in the NeoStaples Resource Economy: Impact Benefit Agreements and Aboriginal Governance in Canada's Nickel Mining Industry," *Studies in Political Economy*, vol. 91 (March 2013), pp. 7–33; and A. Dow and S. Dow, "Economic History and Economic Theory: The Staples Approach to Economic Development," *Cambridge Journal of Economics*, vol. 38, no. 6 (2014), pp. 1339–53.

<sup>31</sup>M. Watkins, op. cit., p. 140.

<sup>32</sup>Ibid, p. 145.

<sup>33</sup>P. Alagidede, “The Economy and the Construction Sector in West Africa,” in *Construction in West Africa*, eds. S. Laryea, S. Agyepong, R. Leiringer, and W. Huges (Accra, Ghana: EPP Book Services Ltd., 2012).

<sup>34</sup>A. Hirschman, C. Díaz Alejandro, and P. P. Streeten, “Dissenter’s Confession: ‘The Strategy of Economic Development’ Revisited,” in *Pioneers in Development*, eds. G. M. Meier and D. Seers (Oxford: Oxford University Press, 1984), pp. 87–111.

<sup>35</sup>Ibid, and A. Hirschman, *The Strategy of Economic Development*.

<sup>36</sup>A. Hirschman et al., op. cit.

<sup>37</sup>A. Hirschman, *The Strategy of Economic Development*, p. 100.

<sup>38</sup>Ibid.

<sup>39</sup>P. Neary, “Real and Monetary Aspects of the ‘Dutch Disease’,” Working Paper no. 5, Dublin, Ireland, Dublin Centre for Economic Research, University College Dublin, 1981, and W. Corden and P. Neary, op. cit.

<sup>40</sup>*The Economist*, op. cit.

<sup>41</sup>Capstone Report Project Mozambique, *Moçambique: Recursos Naturais/sector extrativo para a prosperidade* (New York: Columbia University, School of International and Public Affairs, 2014), p. 30.

<sup>42</sup>ICF International, *Natural Gas Master Plan for Mozambique, Draft Report Executive Summary Submitted to the Government of Mozambique Steering Committee* (Fairfax, Virginia: ICF International, 2012), p. 1.

<sup>43</sup>D. Ledesma, *East Africa Gas - Potential for Export* (Oxford: Oxford Institute for Energy Studies, 2013).

<sup>44</sup>Mozambique experienced a civil war from 1977–1992 between the ruling party called the Front for Liberation of Mozambique (FRELIMO) and the Resistance Movement of Mozambique (RENAMO). The consequences ranged from displacement and deaths from starvation to economic collapse.

<sup>45</sup>Sasol Limited is an integrated energy and chemical company based in Johannesburg, South Africa. Formed in 1950 in Sasolburg, South Africa, the company develops and commercializes technologies (including synthetic fuels technologies) and produces different liquids, fuels, chemicals, and electricity.

<sup>46</sup>Anadarko Petroleum Corporation is a U.S. oil and gas company and one of the world’s largest publicly traded energy exploration and production companies with approximately 2.79 billion barrels of oil equivalent of proved reserves and annual sales volumes of 274 million barrels of oil equivalent as of December 2013.

<sup>47</sup>Eni is an Italian-based multinational oil and gas company. It has operations in 79 countries and is currently Italy's largest industrial company with market capitalization of 68 billion euros (U.S. \$90 billion) as of August 2013.

<sup>48</sup>ICF International, op. cit., p. 2.

<sup>49</sup>SPTEC Advisory, *Mozambique: The Emergence of a Giant in Natural Gas* (Maputo, Mozambique: SPTEC Advisory, January 2013), p. 5.

<sup>50</sup>Ibid, p. 3.

<sup>51</sup>E. Aaboe and T. Kring, op. cit., pp. 33–47.

<sup>52</sup>Ibid.

<sup>53</sup>E. Azevedo-Harman, op. cit., pp. 143–44.

<sup>54</sup>J. Kirshner and M. Power, p. 68.

<sup>55</sup>N. H. van der Linden, S. Bhasin, J. Falzon, V. de Jong, H. van Haelen, and R. C. Pereira, *Capacity Development for Strengthening the Gas Sector in Mozambique (Initiative Draft Report) – A Netherlands Initiative for Capacity Development in Higher Education (NICHE) Country Report* (The Hague: Global Gas Networks Initiative and ECN, June 2014), p. 3.

<sup>56</sup>Capstone Report Project Mozambique, op. cit., p. 27.

<sup>57</sup>Ibid.

<sup>58</sup>M. Parker and H. Kreuze, op. cit., p. 15.

<sup>59</sup>For example, in an email correspondence (January 5, 2015), Prof. Eduardo Neves Joao-Eduardo Mondlane of the University-Mozambique has noted that, “At the moment are only predictions because SASOL the only one which operates in gas production in Mozambique has no effect on GDP. With the rise of ENI and ANADARKO the prediction is that in the forthcoming 3–5 years gas might bring an impact on GDP growth rate and on GDP relative weight.”

<sup>60</sup>L. Fioramonti, op. cit.; F. Obeng-Odoom, “Africa’s Failed Development Trajectory: A Critique,” *African Review of Economics and Finance*, vol. 4, no. 2 (2013), pp. 151–75; and F. Obeng-Odoom, “A New Oil Strategy for Africa,” *Progress*, 1112th edition (2014), pp. 9–12.

<sup>61</sup>E. Aaboe and T. Kring, op. cit., pp. 33–47.

<sup>62</sup>ICF International, op. cit.

<sup>63</sup>R. Mayes, “Gendered Dimensions of Resource Extraction: The Place of Women,” in *Resource Curse or Cure? On the Sustainability of Development in Western Australia*, eds. M. Brueckner, A. Durey, R. Mayes, and C. Pforr (New York: Springer, 2014), pp. 121–33.

<sup>64</sup>D. Ledesma, op. cit.

<sup>65</sup>F. Fernandes, *A Integração do Negro na Sociedade de Classes no Limiar de uma Nova Era (Volume 2)* (São Paulo: Globo Editora, 2008).

<sup>66</sup>Sasol Company Website, “Social Investment,” accessed June 27, 2016, available at <http://www.sasol.com/about-sasol/africa-oil-week/social-investment>.

<sup>67</sup>Ibid, and Mozambique LNG Company Website, “Social Investment,” accessed June 27, 2016, available at <http://www.mzlng.com/Responsibility/Social-Investment/>.

<sup>68</sup>ICF International, op. cit., p. 3.

<sup>69</sup>Ibid, p. 1.

<sup>70</sup>D. Ledesma, op. cit., p. 12.

<sup>71</sup>E. Aaboe and T. Kring, op. cit., pp. 33–47.

<sup>72</sup>D. Harvey, *The New Imperialism* (Oxford: Oxford University Press, 2003).

<sup>73</sup>B. Fattouh and J. Stern, “Conclusion,” in *Natural Gas Markets in the Middle East and North Africa*, eds. B. Fattouh and J. Stern (Oxford: Oxford University Press, 2011), pp. 531–54.

<sup>74</sup>Couto, Garcia and Associates, *Mozambique* (Maputo, Mozambique: Couto, Garcia and Associates, March 2013).

<sup>75</sup>F. Obeng-Odoom, “The State of African Cities 2014,” *Journal of Asian and African Studies* (2014).

<sup>76</sup>Franklin Obeng-Odoom, “Oil, Local Content Laws and Paternalism: Is Economic Paternalism Better Old, New or Democratic?” *Forum for Social Economics*, DOI: 10.1080/07360932.2016.1197844 (2016).

<sup>77</sup>Couto, Garcia and Associates, op. cit.

<sup>78</sup>F. Obeng-Odoom, “A New Oil Strategy for Africa.”

<sup>79</sup>M. Parker and H. Kreuze, op. cit.

<sup>80</sup>W. El-Khattam, S. Hussein, and M. Abdel-Rahman, “State of Energy Infrastructure in Africa: How Much Investment is Needed to Migrate to Renewable Energy,” in *Energy Transition in Africa*, eds. T. Simelane and M. Abdel-Rahman (Pretoria, South Africa: Africa Institute of South Africa, 2012), pp. 55–100.

<sup>81</sup>M. Huber, *Lifeblood: Oil, Freedom, and the Forces of Capital* (Minneapolis, Minnesota: University of Minnesota Press, 2013), and R. Mayes, op. cit.

<sup>82</sup>See, for example, ICF International, op. cit.

<sup>83</sup>J. M. Barth, op. cit.

<sup>84</sup>F. Obeng-Odoom, “Problematizing the Resource Curse Thesis.”

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