THE LOSS OF PROPERTY RIGHTS AND THE COLLAPSE OF ZIMBABWE

Craig J. Richardson

What in the world happened to Zimbabwe? Although the country certainly had its share of difficulties during the first 25 years since independence in 1980, it largely dodged the famines, civil strife, and grossly mismanaged government policies so common in other sub-Saharan African countries. Through the 1980s, its annual real GDP growth averaged over 5 percent, and unlike other African countries agricultural yields were large enough to allow the country to export grain. In the following decade, economic growth slowed, and government policies were less than efficient, but Zimbabwe still managed to grow an average of 4.3 percent, in real terms.[1] The government also offered free education and relatively good access to medical care. Population growth was slowing, and foreign direct investment increasing. With rich mineral assets, an educated workforce, and beautiful natural wonders, Zimbabwe appeared to have the best chance to be an African success story.

Cato Journal, Vol. 25, No. 3 (Fall 2005).
Craig Richardson is Associate Professor of Economics at Salem College. He thanks Barrie Richardson, Chris Mackie, Art Goldsmith, Hernando de Soto, and Arthur Goldsmith for helpful comments.

---

[1]This excludes 1992, during which Zimbabwe experienced its worst drought in 50 years, causing GDP to drop by 9 percent. There were no other years of negative growth during the 1990s, except 1999, in which GDP declined by 0.7 percent.

However, in 2000 through 2003, the Zimbabwean government initiated a land reform policy that involved forcibly taking over white-owned commercial farms, ostensibly to redistribute this property to landless blacks. The rationale for this policy was to redress the British seizure of fertile farmland in the late 1890s, which resulted in hundreds of thousands of blacks being pushed onto lower grade communal lands.

No compensation was paid to the commercial farmers, and hundreds of thousands of employed black farm workers were left without jobs. Despite a ruling from Zimbabwe's Supreme Court that the action was illegal, the Mugabe-led government continued with the land takings. These land reforms marked an important turning point for Zimbabwe. It was the first time in its 20-year history that laws regarding property rights were no longer respected or defended. Property titles, which once served as a key insurance mechanism for guaranteeing bank lending, no longer were recognized by the Mugabe government.

Within a short period, Zimbabwe went from a place of hope to one of the grimmest places on Earth. The economy collapsed by 5 percent in 2000, 8 percent in 2001, 12 percent in 2002, and an estimated 18 percent by 2003 (OECD 2004: 357). Inflation reached 500 percent and Zimbabwean dollars lost more than 99 percent of their real exchange value (IMF 2003: 28). The International Monetary Fund, the United Nations, and the Organization for Economic Cooperation and Development blamed the "severe drought" in 2001–02 along with a host of other factors—including AIDS, poor fiscal and monetary policies, and rigid price controls—for causing much of the food shortages and resulting economic difficulties. Although the other factors certainly contributed negatively to Zimbabwe's economy, the land reforms and the changes in rainfall were the only

variables that appeared to change dramatically during the 2000–03 period. Thus, they are the primary suspects in plumbing the reasons for Zimbabwe's quick collapse.

In this article, I argue that the land reforms were the primary driver of Zimbabwe's sudden collapse, not the lack of rainfall. After giving a brief overview of the literature that covers the link between property rights and economic growth, I correlate official Zimbabwe government rainfall data with GDP growth, and also use this data to rank the severity of the 2001–02 drought versus other droughts in the past 50 years. Next, I illustrate the precise mechanics of Zimbabwe's collapse, by showing how the damage to property rights destroyed three key, yet invisible, components of the marketplace: investor trust, land equity, and entrepreneurial knowledge and incentives. Finally, I use ordinary least squares regression analysis to independently assess the impact of the rainfall, land reforms, political strife, labor productivity, capital formation, and foreign aid on Zimbabwe's economic growth. I conclude that over 2000-03 period, the land reforms alone were responsible for an estimated 12.5 percent average annual decline in GDP growth. Rainfall played a minimal role in the GDP contraction. Perhaps most dramatically, estimates made in this paper indicate that after the revoking of commercial farm property titles, the aggregate value of Zimbabwean farmland dropped so quickly that the net loss *in one year* was nearly three and a half times larger than all the World Bank aid ever given to Zimbabwe. This loss in wealth rippled throughout the economy, severely strained the banking sector, and led to a rapid downward spiral in the economy.

The collapse of Zimbabwe is thus a dramatic natural experiment that serves as a compelling case study on the economic consequences of damaging property rights.

Previous Work on Property Rights and Economic Growth

Property rights have long been recognized as a key ingredient in markets, as noted by Adam Smith ([1776] 1976) and much later, Frank Knight (1971). Both pointed out that economic activity is enhanced when people are able to secure the value of their work in a legally defended asset. Economic historians such as North (1973) and Rosenberg (1994) have argued that property rights are important with respect to long-run economic growth. Hernando de Soto (2000) notes that a property system creates a network through which people can rearrange their assets into more valuable combinations. By creating such a network, de Soto argues, developing economies can grow far more quickly, because previously untitled land can now be leveraged as equity to build new businesses.

Yet most of the recent theoretical work explaining economic growth has been framed by neoclassical models that underscore investment in technology, human capital and international trade flows (Solow 1956, Romer 1986, Grossman and Helpman 1991). These models offer important insights into causes of economic growth, but they implicitly assume that there are well-enforced private property rights (Heltberg 2002). Easterly (2002) nicely summarizes many theoretical reasons for Africa's dismal performance, but again barely mentions Africa's poorly defined property rights as a contributing factor.

Some economists, however, have shown more interest in empirically measuring the link between property rights and economic growth. Scully (1988) reported that countries with well-developed property rights and market structures experienced, on average, 2.6 percent GDP growth, compared with 1.1 percent in countries where property rights were limited and there was a great deal of state intervention. Heitger (2004) showed that a doubling of an index of property rights more than doubled living standards, and concluded that

property rights were one of the ultimate sources of economic growth. Goldsmith (1995) also found that less-developed countries enjoyed faster growth when they had more secure property rights, as measured by a Heritage Foundation index.

On the other hand, Torstennson (1994) reported in a cross-sectional analysis of 68 developed and developing countries, that those countries which experienced arbitrary seizures of property had negative economic growth. His study predicted that a country might increase its growth rate by more than 1 percentage point by putting a stop to such seizures. Of the 15 countries in his study that undertook arbitrary seizure of property, 9 had negative growth rates. They included Chad (-6.1 percent), Liberia (-4.0 percent), and Zaire (-5.1 percent). Those findings appear to underestimate the total impact of property seizures, at least in the case of Zimbabwe.

The underlying reasons for this economic growth are buttressed by other studies. For example, preliminary evidence in Peru suggests that the nationwide effort to secure land titles has vastly increased the labor supply, because people spend much less time guarding their property, thus increasing economic growth (Field 2002). In addition, research has shown that investments in land improvements on titled land were 1.4 to 2.2 times higher than on untitled land in Paraguay, Thailand, Brazil, and Honduras (Alston et al. 1996, Feder 1999). The reason for this, as demonstrated by Broegaard et al. (2002) in a Nicaraguan study, is that formal land documents increase the value of the land by giving better incentives to invest and engage in long-term land use, such as growing perennial crops. All of this results in higher output. The authors also noted that rural credit markets need to be developed in tandem, as titling currently has little impact on the credit supply in Nicaragua. They conclude that without formal titles, landowners in Nicaragua tend to be

rich individuals with liquid assets, who are not necessarily the most productive users of the land. However, there is also evidence from Thailand (Feder et al. 1988) and Honduras (Feder 1999) that shows the positive improvement in credit access and land prices after issuing formal land titles. Titled farms obtained 3 to 4 times as much credit as untitled farms. Furthermore, titled land was valued 1.8 times higher than untitled land in both countries.

Land security also encourages conservation and sustainable use of natural resources, as shown by Heltberg (2002). In Central America, deforestation and environmental degradation have brought renewed attention to land titling and the security of property rights (Lutz 1998 and Utting 1996). In Zimbabwe, satellite photos clearly indicate that areas without well-defined property rights suffer severe erosion, as communal farming methods take their toll through slash and burn agriculture. Small and large-scale farms with property titles (owned by both whites and blacks) suffer no such environmental degradation (Prince 2004).

Just How Severe Was the Drought?

In order to untangle the reasons for the collapse of Zimbabwe, a critical piece of the puzzle is assessing the severity of the 2001–02 drought, which occurred during the same time frame. Reports from the IMF (2003), USDA (FASonline 2002) and the UN (2004) all concurred that the devastating food shortages since 2000 were largely to be blamed on the "severe drought." For example, the IMF's Executive Director for Zimbabwe, Ismaila Usman (2003), argued that this drought was the worst in 50 years, and appealed to the IMF to give Zimbabwe another chance. The United Nations' 2004 Humanitarian Appeal asked

for $95 million in aid, blaming Zimbabwe's "vulnerability to climatic fluctuations and the shock of drought, the HIV/AIDS pandemic and a constrained policy environment" (UN 2004). However, the severity of the drought was surprisingly hard to substantiate, because existing studies relied on secondary sources or a small subsample of rainfall stations (Richardson 2004: 70–74). Little attention was paid to the land reforms as a possible explanation for the food shortages. Indeed, a much better case for aid can be made if a country is seen as being down on its luck, and in an economic tailspin due to factors outside its control. Perhaps this is the reason the hard questions were never asked.

Measuring the actual amount of rainfall is thus imperative in order to separate the impact of the drought from the land reforms. Fortunately, Zimbabwe's Meteorological Services Department granted me special permission to view this highly sensitive data. These primary data included individual data on all 93 rainfall stations in the country, reported on a month-to-month basis. The monthly data for these 93 rainfall stations were summed over 12 months, and then averaged, to find the countrywide mean rainfall for a given agricultural year. The data tell a compelling story that does not agree with any prior explanations.

Figure 1 shows that from 1981 to 1998, there was a close correlation between real GDP growth and rainfall (the simple correlation coefficient is 0.65). That link, however, was broken in 2000, the year of the land reforms. GDP growth plunged downward, even as rainfall returned to above-normal levels, indicating the serious collapse in the agricultural sector's production levels. Using the data from Table 1, one can infer a sharply different conclusion than the IMF regarding the 2001–02 crop season. The amount of rainfall during that time was just 22 percent below the 50-year average. By ranking cumulative rainfall

over the past 50 years from lowest to highest, the 2001–02 growing season comes in 13th place. In addition, the probability of having a rainfall season like this one was 0.212, or 21.2 percent, as seen in the second column. In other words, this "drought" occurred every five years or so. In contrast, the drought of 91-92 truly was a fifty-year drought, with rainfall 77 percent below average, and a probability of occurrence of just 0.028, or 2.8 percent. This anomalous event led to a one-time drop in GDP growth of 9 percent, which was the worst performance for Zimbabwe during the entire 1990s. However, the country quickly recovered in the next year. Contrast that with 2003, which had near-average rainfall, but GDP growth at -18.5 percent.

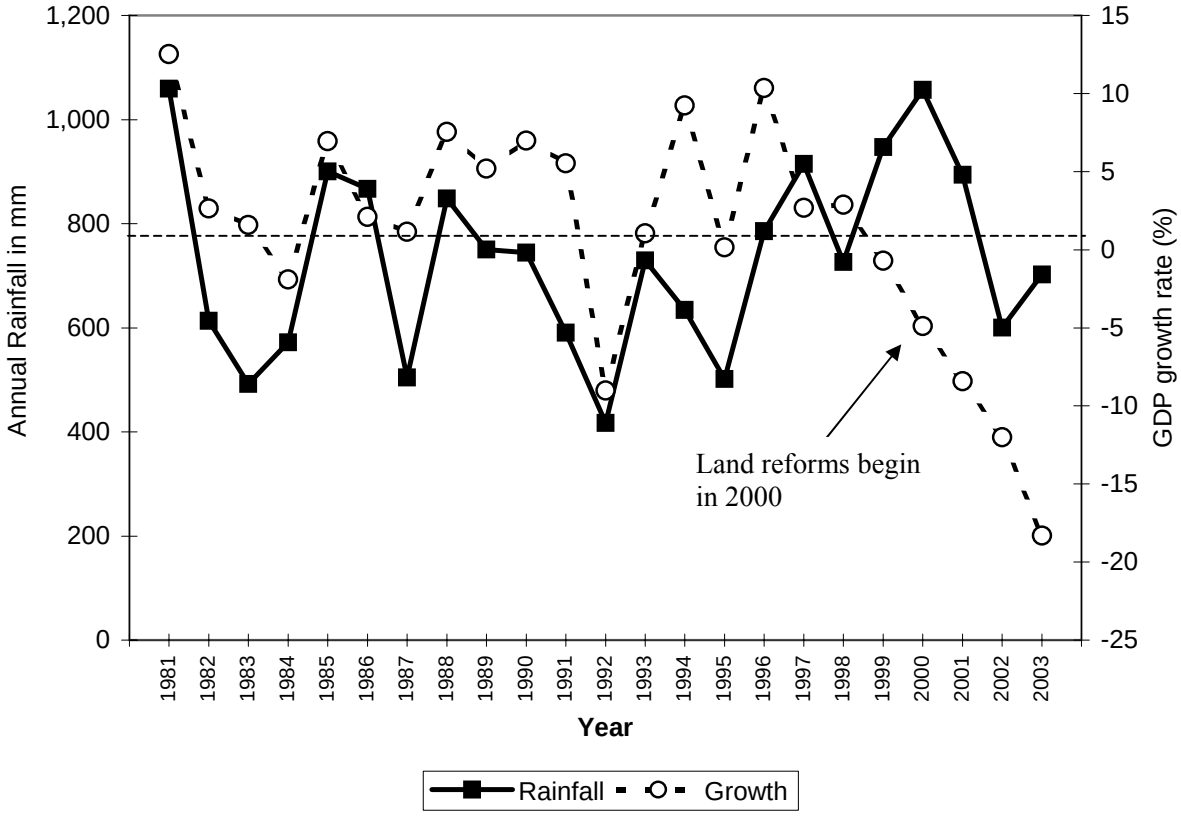
There is no doubt that the 2001–02 drought caused devastation for communal farmers. However, to put primary blame on the drought for the sudden drop in overall agricultural production, as the IMF, USDA, and UN do, misses a key point. Zimbabwe differs significantly from other African countries that suffered through the same drought. The reason is that it possessed large dams and well-engineered irrigation systems for its commercial farming regions. Because of the early and large amount of rainfall in late 2001, dams throughout Zimbabwe were reported as full, with enough water to last through the next rainy season.[2]

Despite the restoration of normal rainfall patterns after 2002, international donor organizations continued to adhere to the myth that the drought was a principal cause of Zimbabwe's food shortages, while largely ignoring the land reform issue. For example,

[2]Andrew Natsios, Administrator for USAID, reported at a Foreign Press Briefing, on August 20, 2002 that "there is water available, even if there's a second-year drought, to grow a crop, but the crops aren't being planted because the commercial farmers and farm workers have been evicted by the government. We have urged them to reconsider their expropriation of these farms at a time when that really was the insurance policy for people to survive in a severe drought." The Zimbabwe's *Daily News* reported on May 15, 2002

FIGURE 1

Annual Rainfall and GDP Growth



NOTE: Average annual rainfall over 50 years = 754 mm, using data from 93 rainfall stations (shown by dotted horizontal line).

SOURCES: Meteorological Services Department, Zimbabwe, and World Bank (2002) *World Development Indicators*. 2003 is an OECD estimate.

---

that Zimbabwe's dams were reported as 74 percent full, and Peter Sibanda, Bulawayo's Director of Engineering Services, said there was enough water to last through the next rainy season.

TABLE 1

TOP 15 DROUGHTS IN ZIMBABWE, 1953–2003

Rank	Crop Year	Annual Mean Rainfall	Probability of Occurrence	Percent Below 50-Year Average
1	1991–92	425.1 mm	2.8%	-77.4%
2	1972–73	488.0	6.1	-54.6
3	1994–95	491.6	6.4	-53.4
4	1982–83	502.3	7.2	-50.1
5	1967–68	502.9	7.2	-50.0
6	1986–87	516.6	8.4	-46.0
7	1963–64	544.7	11.2	-38.5
8	1981–82	573.5	14.7	-31.5
9	1983–84	577.6	15.3	-30.6
10	1990–91	586.5	16.5	-28.6
11	1993–94	615.9	21.1	-22.5
12	1964–65	616.8	21.2	-22.3
13	**2001–02**	**616.9**	**21.2**	**-22.2**
14	1959–60	617.4	21.3	-22.2
15	1978–79	636.5	24.7	-18.5

NOTE: The average rainfall for the past 50 years was 754.7 mm. The calculations for probability of occurrence assume an underlying normal distribution for annual mean rainfall.

SOURCE: Primary data for 93 rainfall stations obtained from the Meteorological Services Department, Zimbabwe, and analyzed by author.

the Mercy Corps (2003), an aid organization that dispenses millions of dollars each year to developing nations, reported in 2003 that Zimbabwe was experiencing a "crippling drought," leading to "widespread food shortages."

Damage and Disruption to Trust, Land Equity, and Knowledge

Since the drought had effects far less severe than is generally understood, it is now necessary to explore in depth the consequences of the land reforms on Zimbabwe's economy. As noted, the 2000–03 land reforms were significant because they marked the first time in Zimbabwe's history that property rights had been openly ignored by the Mugabe government.

We have also seen that the literature indicates that property rights are correlated with economic growth. Unlike those studies, however, I propose that the relationship between economic growth and property rights is not a linear one. There are likely diminishing returns to GDP growth, as property rights improve, not unlike the process of building trust in a relationship.[3] Damaging property rights, on the other hand, is likely to cause a sudden collapse. When examining Zimbabwe's key economic indicators, it is indeed as if the country were pushed off a cliff in 2000.

There are three effects of attenuating private property rights that ultimately change individuals' perceptions in a drastic way. First, there is the loss of trust in the government to enforce the law, which dramatically affects foreign investors' view of the country. Second, the loss of property titles dramatically limits the amount of borrowing and entrepreneurial activity, by disrupting the banking sector. Individuals no longer can offer

[3] The case of Nicaragua is a prime example of this point (Richardson 2004: 135–41).

banks their property as collateral for a loan. Third, there is the loss in the incentive to pass along entrepreneurial knowledge, and work initiatives are sharply stymied as well, since one's investment is not retained.

Loss of Investor Trust

In 1993 the Zimbabwean Stock Exchange (ZSE) was opened to foreigners for the first time. Investors were bullish on Zimbabwe, and by 1996, Zimbabwe's equity markets were surging. More than half the growth in the top 35 sub-Saharan companies (excluding South African groups, which are listed separately) came from Zimbabwe. The number of Zimbabwean companies in the region's top 35 rose from 9 to 11 in one year, but more importantly, their combined market capitalization more than doubled to $2.6 billion from $1.2 billion. Zimbabwe was one of top performers in the world's emerging markets and a new favorite of investors. Four companies were brand new entrants, among them, Meikles Africa, a conglomerate with ties to retailing, tourism, agriculture, and manufacturing (*Business Times* 1997).

Yet in 1998, the stock market began to plunge. One of those reasons had to do with a loss of confidence in the government, including the government's publicly stated intention to acquire commercial farms for resettlement. Another factor included high interest rates, which lured investors to money markets. At the end of 1998, the value of stocks traded on the ZSE had dropped by 88 percent (*MBendi Profile* 2004).

Foreigner investors became increasingly concerned with the Mugabe government's willful disregard of the law, especially after its own Supreme Court declared the land seizures unconstitutional in 2000. Granted, there had been numerous human rights abuses, and wasteful, corrupt expenditures by government officials, but this situation was far

different. An unnerving precedent had been set: For the first time, the executive branch of government condoned the involuntary expropriation of private property, and there was nothing the judicial branch could do. Indeed, President Mugabe simply replaced judges who were not sympathetic toward his aims (Meredith 2002: 199–207).

Intimidated by these actions, investors and businesspeople worldwide wondered if homes, stocks, or other businesses could be next. The result was a flight of foreign investment as nervous investors quickly pulled out their financial stakes in the country. Between 1998 and 2001, foreign direct investment dropped by 99 percent. In addition, the risk premium on investment in Zimbabwe jumped from 3.4 percent in 2000 to 20.4 percent in 2001 (World Bank 2002). Simply the discussion of the potential loss of property rights had very real consequences.

Loss of Land Equity

After the land reforms began in 2000, newly resettled Zimbabweans were assigned plots of former commercial farmland without land titles. Instead, Zimbabweans were forced to lease the land from year to year from the government. With no means to borrow against their land, the new farmers could not obtain loans from banks for seeds or farm equipment. As the farm seizures continued, banks became increasingly reluctant to lend to the remaining commercial farmers whose land had been listed for compulsory acquisition by the government, or occupied by squatters (OECD 2003: 358).

The land seizures caused a vast constriction of borrowing which rippled from business to business, and sector-to-sector. There was no way for banks to foreclose on the land, because the Zimbabwean government became the sole property owner, rendering the property titles valueless, which severely impacted the banking sector. The seizures point

out an important lesson: When a government seizes land in an effort to tap into the land's wealth, the amount it captures will only be a tiny fraction of the land's full potential. The rest of that potential quickly evaporates if there is no way for the land to be leveraged, and no way for the funds to be channeled from one source to another by a network of economic activity.

How much wealth was lost from the country just as a result of the farm seizures? I estimate that from 1999 to 2000, more than US$5 billion in wealth vanished from the agricultural sector. This estimate was obtained by first gathering information from the Commercial Farmer's Union of Zimbabwe (CFU), which included the total revenue from all commercial farm production from 1997 through 2003.

To impute the value of commercial farmland is not easy, given Zimbabwe's fast-changing environment of high inflation and parallel exchange rates. An admittedly crude estimate was made using other available information. First, in 1997 there were 11.3 million hectares of commercial farmland, and the average selling price in that year was Z$9,883 per hectare (Rugube and Chambati 2001: 14). There was slightly above average rainfall that year, making it a good representative year for typical agricultural revenue. Therefore, the total value of farmland in that year was approximately Z$111.678 billion, or US$9.384 billion, using the parallel exchange rate in that year of 11.9Z$ = 1 US$.

What was the rate of return on that land? According to the CFU, commercial farmers earned US$1.119 billion in revenue in 1997, a return of 11.92 percent. Using that return, the approximate value of commercial farmland in succeeding years was imputed by dividing the value of agricultural production, in U.S. dollars, by 0.1192.

During 2000, the value of the commercial farmland dropped dramatically by US$5.3 billion, as can be seen in Table 2. Moreover, the land changed in character and was now what de Soto (2000) calls "dead capital," because it was unable to be leveraged and used as equity. The farmers who tilled the land quickly resorted to inefficient subsistence farming techniques. The loss of $5.3 billion in wealth caused a reverse multiplier effect, quickly destroying the networks of economic activity that had been created before the abrogation of private property rights.

To put this in perspective, as of February 2005 the World Bank had approved a total of 19 loans and 14 credits over Zimbabwe's 25 year history, for a total of approximately US$1.55 billion, as noted on its website. Thus, in just one year, the $5.3 billion loss of financial equity in the farmland sector *alone* exceeded all of the World Bank aid ever given to Zimbabwe, by 242 percent. This wealth drop also equaled 65 percent of Zimbabwe's GDP in 2003, which the World Bank estimated at $8.3 billion.

With banks now holding worthless titles and unable to foreclose on properties, 13 of Zimbabwe's 41 banking institutions were in financial crisis by late 2004. In particular, the failure of the Trust Bank in 2004 indicated the depth of the financial crisis. Trust's closure was particularly worrisome to financial experts because the Reserve Bank of Zimbabwe (RBZ), the nation's central bank, poured in billions of dollars of taxpayers' money in a bid to rescue the bank, but the effort still failed (Muleya 2004). There is another telling statistic: Prior to 1997, an average of 1,600 tractors were sold per year throughout Zimbabwe, with farmland typically used as collateral. By 2002, total national sales dropped to only eight tractors (IMF 2003: 26). Gross private capital formation, once a healthy 20 percent of GDP in 1995, now fell to –6.7 percent in 2002, as farming equipment

was looted, destroyed, or sold, and new farmers saw little reason to invest in tobacco barns or tillage equipment (OECD 2004: 360–62). Zimbabwe's conversion from productive to dead capital was nearly complete.

TABLE 2

LOSS IN AGRICULTURAL REVENUE AND WEALTH FROM COMMERCIAL FARMLAND, 1997–2003

	1997	1998	1999	2000	2001	2002	2003
Total commercial agricultural revenue (Z$, millions)	13,300	21,184	33,603	48,933	102,843	249,239	524,560
Parallel exchange rate (Z$ to US$)	11.9	21.4	38.3	200.0	410.0	1,100.0	1,800.0
Total agricultural revenue (US$, millions)	1,118.6	989.4	877.1	244.7	250.8	226.6	291.4
Imputed value of commercial farmland (US$, billions)	9.38	8.30	7.36	**2.05**	**2.10**	**1.90**	**2.44**
Yearly change in farm-land value (US$, billions)	--	-1.08	-0.94	-5.31	-0.05	0.20	0.54
Cumulative loss (US$, billions)	--	-1.08	-2.02	-7.33	-7.28	-7.48	-6.94

NOTES: The imputed value of farmland is found by dividing the total agricultural revenue by 0.1192, which was the average rate of return on titled farmland property in 1997. The enormous drop in wealth occurs in 2000, the first year of the land reforms. The numbers in **bold** indicate the change from productive to dead capital, as property titles were revoked. The collapse in the banking sector meant a reverse multiplier effect many times greater than the initial losses.

SOURCES: Zimbabwe Commercial Farmers' Union, the IMF, and author calculations.

Loss of Knowledge and the Tragedy of the Commons

Aside from the damage done to the banking sector, the land reforms caused big changes in agricultural production. In 1999–2000 commercial farmers planted 200,000 hectares of farmland; in 2000–01 it was 90,000 hectares, and by 2001–02 it was only 50,000 hectares (a hectare is 2.2 acres). As a result, maize, groundnuts, cotton, wheat, soybean, sunflowers, coffee, and sheep production contracted between 50 and 90 percent during the 2000–03 period. Only drought-resistant sorghum had any gains, although only 5,000 hectares were planted over this time.[4]

Since the government had no plan for redistribution or access to property titles, more than half of the vacated farms were left unclaimed and unused. The commercial farmers took with them the intricate knowledge needed to produce a variety of crops under arid conditions. The drop in hard currency lost from commercial farming output meant that the new farmers also had no money for seeds or fertilizer. This hard currency was crucially important to Zimbabwe because it provided a means to purchase imports of everything from spare parts to cars and gasoline.

With the absence of property rights, Zimbabwe's advanced system of commercial farming quickly liquidated, and the tragedy of the commons replaced it. Godwin (2003) observed that evicted farmers dug up, sold, or took the irrigation pipes; some ZANU-PF supporters even melted pipes down to sell as coffin handles or scrap metal. Sophisticated farming equipment was looted, set on fire or stolen by marauding groups. To make matters worse, the Grain Marketing Board (GMB), run by the Zimbabwe government, delivered

[4]Calculations made using data sent to me from Commercial Farmers' Union, Zimbabwe.

seeds late in 2001, and many communal farmers criticized it because their maize crops did not receive a basal fertilizer dressing, which is important for root growth. Without it, maize is very susceptible to droughts (FAO 2002: 7). Most important, the people who replaced the commercial farmers lacked the knowledge of running a commercial farm, and many farms were simply left fallow or the wrong types of inputs were used.

The conversion from commercial farms to communal farms transformed increasing numbers of Zimbabweans back to a subsistence form of living, and turned once fertile farmland back to the bush. During the 2001–02 drought, communal maize production dropped by a stunning two-thirds, from 1.091 million tons in 2000–01 to only 315,000 tons the following year. The drought reduced communal farms to only 7 percent of the productivity of commercial farms by the end of 2002, whereas they had been 28 percent as efficient in 1999–2000. Another way of putting this is that in the 1999–2000 crop year, one hectare of commercially farmed land produced the same as 3.6 hectares of communally farmed land. Two years later, the ratio was 1 to 15, even using the evicted commercial farmland.

What If Land Reforms Had Not Taken Place?

If land reforms had not taken place, the drop in agricultural production would have not been nearly so dramatic. Zimbabwe's insurance policy—its irrigated commercial farm system—would have greatly ameliorated the harm of the drought by providing the hard currency for seeds for the following year and food for the present. Zimbabwe would have simply exported very little of its maize and used the majority of it to feed the people. The drought would have registered as a tough year but hardly a catastrophe, as the following

year brought restorative rains. In fact, as we have seen, dams were widely reported as full throughout this period.

The commercial farms' abilities to weather droughts is demonstrated by examining the changes in maize yield, on a per hectare basis, for communal versus commercial farmers. As Table 3 shows, during the 2001–02 drought the yield for maize per hectare only dropped 15.7 percent (from 4.28 to 3.70 tons per hectare) for commercial farmers whose land had not yet been seized. Communal farmers' yield, however, fell precipitously by nearly 75 percent of the previous year's production levels.

I also hypothesize in Table 3 what might have happened if land reforms had not taken place. Total commercial maize production can be approximately projected by employing the yearly productivity changes, per hectare, of the remaining commercial farms. For example, in 2000–01, commercial maize production per hectare increased by 5.7 percent. This means that the commercial acreage that yielded 810,000 tons in 1999–2000 would have yielded an additional 5.7 percent the following year. The total yields for 2000–01 would have increased by approximately 46,000 tons, for a total commercial output of 856,000 tons.[5] Instead, because of rapidly falling total commercial acreage, output collapsed to 385,000 tons. Table 3 also shows that without land reforms total production by the end of 2002 would have been more than twice as high: 1 million tons of maize versus 500,000 tons.

[5] This analysis assumes there were no significant differences in agricultural yields per hectare between seized farms and remaining farms.

TABLE 3

DIFFERENCES IN YIELDS AND PRODUCTION BETWEEN COMMUNAL AND COMMERCIAL FARMS, FOR MAIZE PRODUCTION, 1999–2002

	1999–2000	2000–01	2001–02
Yield (tons per hectare)			
Communal farms	1.13	0.96	0.25
Yearly productivity change	–	*-17.7%*	*-74.0%*
Commercial farms	4.05	4.28	3.70
Yearly productivity change	–	*+5.7%*	*-15.7%*
Ratio of communal to commercial production	0.279	0.224	0.068
Actual Production (1,000s of tons)			
Communal farms	1,338	1,091	315
Commercial farms	810	385	185
Total	2,148	1,476	500
Hypothesized Production (Without land reforms)			
Communal farms	1,338	1,091	315
Commercial farms	810	**856**	**722**
Total	2,148	**1,947**	**1,037**

SOURCES: Data for yield and actual production is from IMF (2003: Statistical Appendix, Table 3), which used information from official government agencies in Zimbabwe. **Projections in bold**, calculated by author using data from commercial farms' yearly productivity changes.

Ripple Effects through the Economy

Zimbabwe's government now faced two enormous and pressing problems as its commercial sector disappeared. First, it was apparent that with the precipitous drop in maize production, its citizens would no longer be able to feed themselves. Second, its most lucrative cash crops, such as tobacco and cotton, were no longer providing sufficient foreign exchange. Zimbabwe's decline in cash crops badly hurt the government's coffers, which depend on hard currency. From 1999 to 2000, commercial farm revenue dropped from US$877 million to just US$247 million. In normal years, the net foreign exchange earnings from the agricultural sector provided between 40 and 45 percent of the total foreign exchange for the country, and about 80 percent of that figure originated from commercial farming.[6]

The lack of hard currency caused by the collapse of the commercial farming sector meant that the government had little money to spend on important agricultural inputs, such as fertilizer, for the communal farmers. In addition, the deficit-ridden and government subsidized GMB was unable to guarantee a pre-planting price for maize, which made farmers reluctant to produce a crop that probably would have a very low return. Price controls on fertilizer created shortages, as companies were reluctant to deliver the input at a loss. Late payments by the GMB also stymied farmers' initiative to grow maize. As a result, thousands of hectares remained fallow after 2000, adding to the collapse of production caused by the drought and the land reforms. The downward spiral has the

[6] This information was provided to me by Neil Wright, an economist for the Commercial Farmers' Union.

potential to get worse each year, as crops are not adequately fertilized, which results in lower yields, and even less money for fertilizer the following year (FAO 2002: 1–3).

The damage done to the agricultural sector spread quickly to Zimbabwe's relatively sophisticated manufacturing sector, as industrial production declined by 10.5 percent in 2001 and an estimated 17.5 percent in 2002. Seven hundred companies shut their doors by late 2001 (BBC 2001). The reason was because of the symbiotic relationship between the two sectors. In addition to providing nearly half of the hard currency, agricultural production provides about 40 percent of the raw inputs for manufacturing (Sugunan 1997). According to OECD (2004: 361) estimates, manufacturing production declined by 13 percent in 2003, compared with a decline of 15 percent in the same period in 2002. Industrial production, which relies on imports, was badly hit by the acute foreign currency shortage. As a result, output of nonmetallic minerals fell by 40 percent, food by 30 percent, textiles by 26 percent, wood and furniture by 20 percent, and transport equipment by 12 percent during 2003.

After 2001, Zimbabwe's total demand for hard currency far exceeded the supply. From April 2002 to March 2003, the amount of foreign currency demanded was US$1.14 billion, far exceeding the expected inflows of US$486.4 million, according to a Ministry of Finance report (Thondlana 2002). The resulting excess demand of US$660 million was reflected in critical shortages of essential inputs and placed Zimbabwe even further behind in its debt repayments to the World Bank.

The Reserve Bank of Zimbabwe fueled inflation by buying up millions of Zimbabwean dollars worth of government bonds to finance the rapidly expanding deficits. The RBZ even invested in a high-speed processor and shredder to keep up with the government's

demand for currency (Richardson 2004: 103). By May 2003, Zimbabwe's central bank ran out of foreign exchange to import the special paper and ink used to print currency, and resorted to printing "bank notes" instead (Njanji 2003). Inflation levels jumped from around 50 percent in the late 1990s to more than 500 percent by the end of 2003 (IMF 2003). In the same year, worthless currency now made food shortages commonplace and severe. One report noted that once well-fed rural Zimbabweans were now forced to make meals out of caterpillars (Thurow 2003).

The Data, Regression Model, and Results

I used ordinary least squares regression techniques to test the hypothesis that the land reforms were the major determinant of the collapse in Zimbabwe's economy, as measured by GDP growth. In doing so, the separate effects of the land reforms, rainfall, and the other independent variables can be determined.

Data

I employed yearly time-series data, covering the period 1961 to 2003, for a total of 43 observations. This time period represented the largest span for which all relevant data were available. The model included Zimbabwe-specific and standard economic measures of economic growth. The Zimbabwe-specific variables measure rainfall and major changes in economic security or "political strife." The data on rainfall were obtained from Zimbabwe's Meteorological Services Department. The "political strife" variables were based on two time periods: the war for independence and the land reforms, both of which caused serious institutional disruptions. The data for the economic variables come from the

World Bank's (2002) *World Development Indicators*, which are available on a yearly basis for Zimbabwe.

Rainfall is an important input because Zimbabwe's economy is heavily influenced by its agricultural sector. A crop year with higher rainfall is hypothesized to lead to higher crop yields, and thus greater GDP growth. Zimbabwe's average annual rainfall (RAINFALL) was measured by taking the mean of 93 different rainfall stations' reported annual rainfall. These stations were widely scattered throughout the country. Rainfall data for each station were reported on a month-to-month basis, so the data first had to be aggregated on a yearly basis before they were averaged.

LANDREFM is a dummy variable that switches on during the four years of the land reforms, from 2000 through 2003. Those years were significantly different from the preceding ones in terms of the erosion of property rights and the accompanying domino effects. Although LANDREFM does not measure property rights directly, its coefficient estimates will help describe the average speed of the economic decline during the 2000–03 period, holding constant the other important factors included in the regression. The focus of this article is primarily on this coefficient, since it gives an important measure of how quickly Zimbabwe collapsed once its property rights were under siege.

In addition, I added another dummy variable—70sWAR—that switches on during 1975–79, the final era of the white minority leadership over Rhodesia (Zimbabwe's former name) and the last vestige of British colonial rule. This variable parallels LANDREFM to some degree, since it also attempts to measure political strife, breakdown in law and order, and lack of economic security. As the white government faced attack during this time from Mugabe-led guerilla soldiers seeking majority rule, the war consumed as much as

one-third of the budget. In addition, Rhodesia was weakening after years of tough sanctions from Britain, which punished it for its anti-democratic policies. Both the war and the sanctions resulted in severe economic consequences during the mid- to late 1970s (Minter and Schmidt 1988: 233).

Standard models of economic growth models consider the size of savings and investment, as well as the labor force, to be important determinants. Saving and investment are considered important components of growth because they play a role in the expansion of productive capacity (Otani and Villanueva 1989). Gross capital formation as a percent of GDP (I/GDP) is used as a proxy to reflect this economic factor.

There is little data available on an annual basis regarding Zimbabwe's labor force. However, the age dependency ratio can serve as a crude proxy for labor productivity. This variable (AGEDEPEN) measures the percentage change in the age dependency ratio, which is the total number of dependents divided by the working population. It is hypothesized here that as age dependency ratio increases, GDP growth will decline, since increasing numbers of children require more time away from the workplace.

Foreign aid has been shown to have negative consequences for economic growth (Easterly 2002). Aid causes dependency and lack of initiative as countries become increasingly interested in finding incentives to get more aid, not less. The worse a country does, the more aid it gets. Thus, it is hypothesized that aid creates perverse incentives. The percent of foreign aid as a share of GDP (FORAID) is used in the regression to measure this phenomenon. Both FORAID and I/GDP are measured as a percent of GDP to adjust for Zimbabwe's hyperinflation, which would cause tremendous distortions in estimation otherwise.

Regression Model and Results

The presumed determinants of economic growth lead to the following model, to be estimated using ordinary least squares:

$$GDPGROW = \alpha + \beta(RAINFALL) + \phi(LANDREFM) + \delta_1(70sWAR) + \delta_2(I/GDP) + \delta_3(AGEDEPEN) + \delta_4(FORAID) + \varepsilon.$$

The variables are defined as follows:

$GDPGROW \equiv (GDP_{t+1} - GDP_t)/GDP_t * 100$, or annual GDP growth in percentage terms,
RAINFALL ≡ average annual rainfall in 100 mm,
LANDREFM ≡ a dummy variable that equals 1 for the years 2000–03 and 0 otherwise,
70sWAR = a dummy variable that equals 1 for the years 1975–79 and 0 otherwise,
I/GDP ≡ gross capital formation as a percentage of GDP,
AGEDEPEN ≡ the percentage change in the age dependency ratio, and
FORAID ≡ foreign aid as a percentage of GDP.

In order to assess the relative importance of rainfall, land reform, and the other independent variables on GDP growth, there were two approaches taken in the regression analysis. The first approach, in typical fashion, reports the size of the estimated regression coefficients as well as the t-statistics. This approach allows one to project the independent impact, of say, a specific change in rainfall on GDP growth, holding the other variables constant. These results are reported in column (a) in Table 4.

The second approach involves standardizing the variables so they are converted to z-statistics, each with a zero mean and a standard deviation of 1. This approach allows one to measure the relative influence of each independent variable in a regression; the resulting

estimates are known as beta-coefficients. Beta-coefficients indicate the net effect on GDP growth after changing a given independent variable by one standard deviation. The larger the absolute value of the beta-coefficient, the more relative strength an independent variable has in influencing the dependent variable. The second approach is useful for assessing whether changes in rainfall or the land reforms had a generally more powerful impact on Zimbabwe's economy. These results are reported in column (b).

As expected, the sign for the regression coefficient for RAINFALL is positive. Using the regression results in column (a) of Table 4, the estimate implies that every 100 mm of rainfall in Zimbabwe led to a 0.97 percentage point increase in real GDP growth, ceteris paribus. The RAINFALL variable barely misses being significant at the 95 percent confidence level (the p-statistic was .056). Evidence thus suggests that rainfall directly influences economic growth.

So how much of a difference did the actual drop in rainfall during the 2001–02 drought make on economic growth? With these regression results, we can directly measure the impact. As Table 1 shows, the rainfall was 138 mm below average in 2001–02, so by multiplying the regression coefficient for rainfall (0.97) by -138, and dividing by 100, the model predicts that the drop in rainfall in that year contributed to a slowdown of GDP growth by only -1.34 percentage points, ceteris peribus. The economy contracted by about 10 percentage points in 2002, so this means the drop in rainfall only accounted for 13.4 percent (less than one-seventh) of the overall contraction.

These results strongly corroborate the first hypothesis of this paper, that the drop in rainfall played a minor role in the economic collapse of Zimbabwe, primarily because rainfall did not drop as much as is commonly believed. These results also suggest that in

subsequent years, rainfall had even less to do with the collapsing economy. However, with the move away from commercially irrigated farming, it can be expected that this variable may play a stronger determinant in Zimbabwe's economic growth in future years.

In contrast, the LANDREFM dummy variable has the largest impact of all the variables on economic growth. The regression coefficient in the base regression shows that each year of the land reforms led to an average 12.5 percentage point collapse in GDP, ceteris paribus. Indeed, if it were not for above average rainfall in the years 1999 to early 2001, the actual contraction of Zimbabwe would have been even greater than the 5 to 8 percentage point collapse that actually occurred. As terrible as conditions are presently in Zimbabwe, this analysis shows they could have been even worse. This variable was statistically significant at the 99 percent level of confidence.

The 70sWAR dummy variable also was statistically significant at the 99 percent level, indicating the serious consequences to the Zimbabwe (then Rhodesia) economy during its struggle for independence. Each year of this battle cost it dearly, as GDP declined 9.2 percentage points per year, ceteris paribus. It was no wonder that after five years, the white-led government was ready to hand over the reins to Mugabe and his ZANU-PF political party.

The other variables, I/GDP, AGEDEPEND, and FORAID had the expected signs but were not statistically significant. This may be because of the relatively small number of observations, or because the variables were not well specified. Perhaps the proxies for labor and capital could be improved with better data. It may also indicate that Zimbabwe's GDP growth is not well described by standard economic growth models. The typical emphasis that is placed upon these types of explanatory variables may be misplaced—

perhaps institution and country-specific variables matter the most in predicting economic growth and collapse in lesser-developed countries.

With regard to the standardized regression approach, column (b) in Table 4 clearly shows that land reforms played the biggest role in the collapse of GDP, as LANDREFM had the largest beta coefficient of –0.543. Social and political strife in the 1970s also has a big impact, as the beta coefficient was second largest, at –0.439. RAINFALL was next most important at 0.257. This second approach also reinforces the initial hypothesis that institutional changes affected Zimbabwe much more than the variation in rainfall. Using ANOVA, the calculated F-statistic was 6.43, strongly rejecting the null hypothesis that the overall regression model had no explanatory power, at the 99 percent level of confidence. The adjusted R-squared was 0.46.

Conclusion

This article has demonstrated that the primary cause of Zimbabwe's 2000–03 collapse was its misguided approach to land reform. By revoking commercial farmland property titles for commercial farms, three disastrous consequences occurred: 1) Foreign investors lost faith in the rule of law and quickly moved money out of the country; 2) Three-quarters of the value of commercial farmland evaporated, leading to a net loss of wealth that far exceeded all the World Bank aid ever given to Zimbabwe, and 3) Agricultural production levels sharply dropped as commercial farmers took their sophisticated knowledge of farming practices to other countries. The collapse of the manufacturing and banking sectors followed as a result. According to regression estimates made in this paper, the overall ripple effects of the land reforms dragged economic growth rates down by an

annual average of 12.5 percentage points for the years 2000-2003, which made Zimbabwe the fastest shrinking economy in the world.

. In contrast to standard explanations, the findings in this paper indicate that the drought played only a minor role in 2001–02; it was responsible for less than one seventh of the total 10-percentage point drop in GDP growth in that year. Rainfall was inconsequential to Zimbabwe's collapse in the following years. If it were not for the above average rainfall in 2002–03, Zimbabwe's economy would have been in even worse shape than it is today.

Zimbabwe thus provides a compelling case study for the perils of ignoring the rule of law and property rights when enacting (often well-intentioned) land reforms. We have seen how Zimbabwe's markets collapsed extraordinarily quickly after 2000, with a domino-like effect. The lesson learned here is that well-protected private property rights are crucial for economic growth and serve as the market economy's linchpin. Once those rights are damaged or removed, economies may be prone to collapse with surprising and devastating speed. This is because of the subsequent loss of investor trust, the vanishing of land equity, and the disappearance of entrepreneurial knowledge and incentives—all of which are essential ingredients for economic growth.

TABLE 4

REGRESSION RESULTS

DEPENDENT VARIABLE: ANNUAL GDP GROWTH (GDPGROW)

Independent Variable	(a) Regression coefficient	(b) Standardized Beta Coefficient
INTERCEPT	-3.51 (-0.74)	–
RAINFALL (+)	0.97* (1.98)	0.257*
LANDREFM (-)	-12.49*** (-2.97)	-0.543***
70sWAR (-)	-9.15*** (-3.31)	-0.439***
I/GDP (+)	0.16 (0.72)	0.129
AGEDEPEN (-)	-0.039 (-0.45)	-0.007
FORAID (-)	-0.49 (-1.34)	-0.204
Adjusted R^2 = 0.46 F Statistic = 6.43 N = 43		

NOTES: Sign for independent variables indicates hypothesized relationship;* denotes significance at the 10 percent level ; ** denotes significance at the 5 percent level; *** denotes significance at the 1 percent level. Figures in parentheses are t-statistics.

References

Alston, L. J., Libecap G. D., and Schneider R. (1996) "The Determinants and Impact of Property Rights: Land Titles on the Brazilian Frontier." *Journal of Law, Economics, and Organization* 12(1): 25-61.

BBC (2001) "Bankers Slam Zimbabwe's Policies." BBC News Online, 4 September (http://news.bbc.co.uk/1/hi/business/1524821.stm).

Business Times (1997) "Zimbabwe Leads Africa in Equity Revolution" (www.btimes.co.za/97/0202/world/world2.htm).

Broegaard, R.; Heltberg J. R.; and Malchow-Moller, N. (2002) "Property Rights and Land Tenure in Nicaragua." University of Copenhagen Center for Development Research Working Paper (www.econ.ku.dk/heltberg/Papers/landtenureNicaragua.pdf).

de Soto, H. (2000) *The Mystery of Capital.* New York: Basic Books.

Easterly, W. (2002) *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics.* Cambridge, Mass.: MIT Press.

FAO (2002) Food and Agricultural Organization, "Special Report: FAO/WFP Crop and Food Supply Assessment Mission to Zimbabwe" (www.fao.org/docrep/005/y6816e/y6816e00.htm).

FASonline (2002) "Zimbabwe: Drought Threatens 2001–02 Summer Crops" (www.fas.usda.gov/pecad2/highlights/2002/02/zim/zimfeb.htm).

Feder, G. (1999) *Access to Land and Poverty Reduction.* Presentation at the International Colloquium forAgrarian Reform and Rural Development in the 21st Century, Puebla, Mexico.

Feder, G.; Onchan, T.; Chalamwong, Y.; and Hongladarom, C. (1988) *Land Policies and Farm Productivity in Thailand.* Baltimore: Johns Hopkins University Press.

Field, E. (2003) "Entitled to Work: Urban Tenure Security and Labor Supply in Peru." Princeton University Research Program in Development Studies Working Paper No. 220 (20 November).

Godwin, P. (2003) "A Land Possessed." *National Geographic* (August): 100-114.

Goldsmith, A. (1995) "Democracy, Property Rights, and Economic Growth." *Journal of Development Studies* 32: 157–75.

Grossman, G., and Helpman, E. (1991) *Innovation and Growth in the Global Economy*. Cambridge, Mass: MIT Press.

Heitger, B. (2004) "Property Rights and the Wealth of Nations: A Cross-Country Study." *Cato Journal* 23 (3): 381–402.

Heltberg, R. (2002) "Property Rights and Natural Resource Management in the Developing Countries." *Journal of Economic Surveys* 16 (2): 189–214.

IMF (2003) *Zimbabwe: 2003 Article IV Consultation- Staff Report.* Washington: International Monetary Fund (July).

Lee, R. (2002) "Crisis in Chidobe." In *Zimbabwe Eyewitness*, World Food Program (www.wfp.org/newsroom/in_depth/africa/sa_chidobe0209.htm).

Lutz, E. (1998) "Agriculture and the Environment: Perspectives on Sustainable Rural Development." Working Paper. Washington: World Bank.

Knight, F. H. (1971) *Risk, Uncertainty and Profit*. Chicago: University of Chicago Press.

MBendi Profile (2004) Zimbabwe Stock Exchange- General Information (http://mbendi.co.za/exch/11/p0005.htm#10).

Mercy Corps (2003) "Mercy Corps Begins Emergency Food Program in Zimbabwe in Response to Drought" (www.mercycorps.org/items/1458/) (15 July).

Meredith, M. (2002) *Our Votes, Our Guns: Robert Mugabe and the Tragedy of Zimbabwe.* New York: Public Affairs.

Minter, W., and Schmidt E. (1988) "When Sanctions Worked: The Case of Rhodesia Re-examined." *African Affairs* 87 (April): 207–37.

Muleya, D. (2004) **"**Wobbly Banks Still Send Tremors." *The Independent* **(**www.theindependent.co.zw/news/2004/October/Friday1/analysis.html).

Njanji, S. (2003) "No Let Up in Zimbabwe's Forex Woes as Country Fails to Even Print Bank Notes." *Agence France Presse* (11 May).

North, D. (1990) *Institutions, Institutional Change and Economic Performance.* Cambridge: Cambridge University Press.

OECD (2003) *African Economic Outlook 2002/2003- Country Studies: Zimbabwe*. Paris: OECD Headquarters.

_____ (2004) *African Economic Outlook 2003/2004- Country Studies: Zimbabwe*.

Paris: OECD Headquarters.

Otani, I., and Villanueva, D. (1989) "Major Determinants of Long-Term Growth in LDCs." *Finance and Development* 26 (3): 41–44.

Prince, S. (1998) "Deforestation and Degradation in Central and Southern Africa." Working Paper. Department of Geography, University of Maryland (www.geog.umd.edu/LGRSS/Projects/degradation.html.)

Richardson, C. (2004) *The Collapse of Zimbabwe in the Wake of the 2000-2003 Land Reforms*. Lewiston: Edwin Mellen Press.

Romer, P. (1986) "Increasing Returns and Economic Growth." *Journal of Political Economy (*95): 1002–37.

Rosenberg, N. (1994) *Exploring The Black Box: Technology, Economics and History.* Cambridge: Oxford University Press.

Rugube, L., and Chambati, W. (2001) "Land Redistribution in Zimbabwe: Five Census Surveys of Farmland Transactions, 1996-2000." Working Paper. Madison: The Land Tenure Center, University of Wisconsin (www.ies.wisc.edu/ltc/live/bassaf0107a.pdf.).

Scully, G. (1988) The Institutional Framework and Economic Development." *Journal of Political Economy* (96): 652–62.

Smith, A. ([1776] 1937) *An Inquiry into the Nature and Origins of the Wealth of Nations.* New York: Modern Library.

Solow, R. M. (1956) "A Contribution to the Theory of Economic Growth." *Quarterly Journal of Economics* 70: 65–94.

Sugunan, V. V. (1997) "Fisheries Management of Small Water Bodies in Seven Countries in Africa, Asia, and Latin America." FAQ Fisheries Circular No. 933 FIRI/C933 (www.fao.org/documents/show_cdr.asp?url_file=/docrep/W7560E/W7560E02.htm).

Thondlana, B. (2002) "Foreign Currency Deficit Hits $660 Million." *The Zimbabwean Independent* (13 December).

Thurow, R. (2003) "Once a Breadbasket, Zimbabwe Today Can't Feed Itself." *Wall Street Journal* (24 December): A1.

Torstennson, J. (1994) "Property Rights and Economic Growth: An Empirical Study." *Kyklos* 472: 231-247.

United Nations. (2004) "Revised Consolidated Appeal for Zimbabwe-Humanitarian Appeal (www.un.org/Depts/ocha/cap/zimbabwe.html).

Usman, I. (2003) "Statement by Ismaila Usman, Executive Director for Zimbabwe." International Monetary Fund, Article IV Report, Zimbabwe.

Utting, P. (1996) *Bosques, sociedad y poder*. Managua, Universidad Centroamericana (UCA).

World Bank (2002) *World Development Indicators.* Washington: The World Bank.