

Anthropogenic Activities and Resource Shortages: The Case of Darfur

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Hermann continues his looks at Malthusian pressures as a contributing factor in the crisis at Darfur. This article focuses on ecological damage caused by human activity combined with rising populations in Darfur as the primary cause of resource shortages. Hermann recognizes additional procedures are required to improve the crisis in Darfur, but proposes more sustainable forms of living that is more suitable to the region along with improved population management can vastly improve the current situation. [Abstract by editor]

Introduction

The ongoing conflict in Darfur is an incredibly complex one, with numerous contributing causes, including ethnic and religious tensions, local and global politics, and complex historical factors. As a result of the complexity and number of contributing factors, identifying a solution for the current conflict in Darfur is a daunting task, if not an impossible one, and no “easy fixes” are immediately obvious. Among the numerous contributing factors, human activities which contribute to ecological damage, along with rising populations, may have some of the most far-reaching and long-term consequence. Further, because these activities are all a direct result of human activity, they may be the easiest to propose solutions for, and these activities may be considered avoidable. Human activities such as pastoralism, rain-fed agriculture, deforestation, and overpopulation directly contributed to the shortage of resources in Darfur, which played a contributing role in the current conflict there. There were numerous points at which intervention or alteration of activities may have helped to prevent resource shortages, and even the conflict itself.

A Brief Review of Malthus

Before examining the case of Darfur, it is appropriate to review the concept of Malthusian pressures, and their link to the ongoing conflict in Darfur. Malthusian pressures are pressures which face a population as a result of a shortage of vital resources, such as potable water, fertile or agriculturally useful land, nutrients, natural resources, or access to these resources (Richter et al. 332). These resource shortages may arise either as a result of a total decrease of production in resources, or as a result of an increase in population which outpaces the production of resources, where there is insufficient growth in production to meet the growing demand as a result of increased population. Such shortages in resources are predicted to cause numerous issues, including poverty, famine, disease, and violence, all of which may be observed

This a research paper is from an English 141 section focusing on Darfur. The paper was turned in officially in May 19, 2008 to the instructor Julie Mullebrouck. The URJ received the paper in October 2008. Wesley Hermann is a current Senior at UCCS majoring is Organismic Biology.

in Darfur. As previously discussed in “Malthus in Darfur” the ongoing violence and conflict in Darfur can be at least partially attributed to resource shortages, as these shortages led to conflict over resources such as food and land, and often enough this conflict was between tribal and ethnic groups (Hermann).

Establishing the Role of Anthropogenic Ecological Degradation

Numerous human activities have contributed to the ecological degradation of the whole of Darfur, which in turn resulted in decreasing yields and shortages of resources. Desertification is a very serious and ongoing problem in Darfur, the entire Sahel region, and indeed, many of the world’s semi-arid regions. Desertification is defined by the United Nations Convention to Combat Desertification (UNCCD) as “land degradation in the arid, semi-arid and dry sub-humid areas resulting from various factors, including climactic factors and human activities” (Sivakumar 144). That is, human activities are considered to be a primary contributing factor to desertification, and while natural causes certainly contribute, human activities are considered to be the primary culprit in ongoing desertification (El-Farouk 172). There are numerous human activities which cause or contribute to desertification in Darfur, including the stripping of nutrients and moisture, removal of vegetative matter, overgrazing, improper and unsustainable agricultural practices, overgrazing and unsustainable animal husbandry and pastoralism, and even climate change. Ultimately, these contribute to desertification, which in turn result in a decrease in land fertility and productivity, decrease in food production, famine, decreasing amounts of freshwater, decreasing quality of available water, increased levels of poverty, and an increase in political instability (Sivakumar 144-145). Desertification and degradation further cause an “irreversible decline in productivity” (Sivakumar 147), meaning that “fewer people and animals could be supported in the North than previously” (Fuller 216). These outcomes conform with the predictions of the model proposed by Malthus.

As previously mentioned, practices in animal husbandry contribute significantly to desertification and ecological degradation. Overgrazing plays a significant role in contributing to desertification, as animal grazing removes grass and other vegetative cover, which results in increased erosion (Sivakumar 147). Sedentary animal raising further plays a role as animals trample and compact the soil, decreasing the soil’s water-holding ability, and preventing the re-growth of ground vegetation, again contributing to increased erosion (Sivakumar 147). It has further been proposed that Darfur may be an example of the “Tragedy of the Commons” scenario, where competition between neighbors over a shared resource results in damage to this shared resource. In the case of Darfur, shared rangelands cannot be protected from damage or overuse by other individuals, and an individual can only protect his or her interests by overusing that resource themselves (Morton 65). In this case, accelerated ecological damage to the rangeland is the inevitable result.

Deforestation and land clearing also have a significant impact on land quality, and directly contribute to desertification. Deforestation and land clearing contribute significantly to erosion, and this is particularly true in areas with sandy soil such as Northern Darfur (Fuller 221). Deforestation may also result in loss of fertile soil, key soil nutrients, the water-holding capacity of the soil, and even a reduction in soil fertility, as farmers are forced to rely on crop residues and dung as a source of fuel as a result of firewood shortages, further contributing to a loss of soil fertility (El-Farouk 172-173). Changes in land use and land cover, such as from natural

ecosystems to agricultural systems are also responsible for significant decreases in soil fertility (Sivakumar 145), and are also responsible for local climate changes including decreased rainfall and decreased sustainable levels of vegetation (Sivakumar 146).

The use of rain-fed agriculture and unsustainable farming practices also contribute directly to the ongoing deforestation in Darfur. Many commonly practiced farming activities such as plowing, field burning, and even planting and seeding can increase wind erosion (Sivakumar 149). Further, improper methods of water use contribute to salt accumulation in the soil (Sivakumar 150). Rain-fed agriculture, the method through which Sudan primarily expanded its agricultural production in recent decades (Ayoub 489) also contributes to land degradation. This method is also practiced in Darfur, although it is inappropriate for nearly all of Northern Darfur (Fuller 220-221), and this method has been described as “heading for total collapse” (Ayoub 498).

Drought has only served to further exacerbate these problems. The Sahel region, which includes much of Darfur, has experienced “The most substantial and declined in rainfall recorded anywhere in the world within the period of instrumental measurements” (Sivakumar 150). In addition to total amounts of rainfall, rainfall frequency and distribution are also significant factors which determine crop yield. While drought and decreasing rainfall may initially appear to be a natural event, there is increasing concern that anthropogenic activities have a significant role in these trends. As we have seen, anthropogenic activities such as deforestation may have an effect on rainfall, and there is also concern that this cycle of land degradation leading to drought is a self-perpetuating cycle (Ayoub, 497). Increasing water use has also resulted in decreasing water tables which further contribute to desertification (D’Osouza and Shoham 523). There is also a strong link between global climate change as a result of the burning of fossil fuels and production of carbon dioxide and land degradation and desertification, as climate change may have impacts on rainfall, temperature, and other weather patterns (Sivakumar 151).

Finally, overpopulation has a significant impact on ecological degradation, for obvious reasons. An increasing number of people results in increasing demands for resources, which in turn requires that individuals increase the area they cultivate (El-Farouk 173), or to adopt more intensive farming practices, such as decreasing the amount of time the land has to regenerate between crops, the fallow period (Fuller 221). In other words, as a population increases, that population has an increasingly large ecological footprint. This idea can be confirmed by observing the severity of ecological degradation with relation to population; desertification is especially severe near major towns, or areas with a large population and a high population density (de Waal 5). Increasing population not only contributes to ecological damage, but also forms a fundamental basis for other condition of Malthusian pressures, causing increasing demand for resources.

Establishing the Role of Overpopulation

The increasing population in Darfur is a contributing factor in creating Malthusian pressures, as it fulfills the second condition predicted by the Malthusian model. The human population in Darfur is increasing incredibly rapidly with an annual growth rate of 3.1%, indicating that the population may double in as little as 25 years (Fuller 217-218). Indeed, human populations grew by six-fold in a sixty year period, between 1917 and 1977 (Fuller 221). With an average population density of six people per square kilometer in 1986, Darfur was already considered

overpopulated. While this seems contradictory, Darfur is considered overpopulated due to its low soil productivity, combined with the high centralization of people around water supplies. Estimates for population density in Darfur now range as high as 25-50 people per square kilometer. Because Darfur is already considered overpopulated, and because the carrying capacity of the land of Darfur has been irreversibly lowered, continued population growth at this or any rate may be considered unsustainable. In addition to the human population, the animal population in Darfur is increasing dramatically, with the animal population increasing between eight-fold and twenty-fold in the same sixty years mentioned above (Fuller 221). Again, this contributes to increased ecological damage, as well as increased demand for resources.

Causal Relationship between Overpopulation, Ecological Damage, and Resource Shortages

The ongoing desertification and land degradation in Darfur combined with overpopulation have resulted in numerous effects which directly correlate with the predictions of Malthus' model, and which directly result in a decrease in vital resources. Increased mortality due to famine and disease has been noted in Darfur (de Waal 20). A decrease in total land availability and quality of land, including fertility, has also been attributed to desertification (Osei-Agyemang 26). Decreasing amounts of available water and decreasing quality of water has also been attributed to desertification (Fuller 144). There has also been a significant decrease in production of major staple foods. While the area under cultivation for millet increased nearly three-fold from 1960 to 1975, the average yield dropped from 600kg per unit area to 400 (Fuller 221). Indeed, a long term trend of decreasing yields has been observed for not only millet, but sorghum, ground nuts, and sesame, with losses in yields ranging from around 40% to over two-fold in a thirty-five year period (Ayoub 493). Historically in Darfur during periods of severe drought, such as those observed in 1984, yields of these key food resources declined drastically, resulting in a dramatic escalation in their prices. As these prices continued to escalate, individuals and families began selling livestock. As this continued, the market became flooded, resulting in a dramatic decrease in the value of livestock, making purchasing of vital supplies ever more difficult (Bush 7, D'Souza and Shoham 521). In some areas, prices of grains increased four-fold, while livestock prices plummeted to as little as one-tenth their previous value (D'Souza and Shoham 521). Deaths of domestic animals may also be attributed to land degradation (El-Farouk 173). Finally, mass voluntary emigration resulted (data).

Unfortunately, as desertification and ecological degradation continue, they will only be amplified by continued human activities. As a result of declining yields and soil fertility, and facing increasing demands, farmers are forced to increase the amount of land being used, and reduce fallow periods. This in turn leads to further decreases in fertility, which in turn necessitates the use of more land and more intensive farming practices, and a self-perpetuating cycle is formed (Fuller, 221).

Proposal

In the case of Darfur, there were numerous opportunities for intervention or alternative activities which may have significantly lessened the shortage of resources, and thus the Malthusian pressures facing the population of Darfur. Because anthropogenic activities are the

primary cause of the resource shortages in Darfur, alternative human activities are the most obvious solution. Of course, this is an incredibly complex issue, and such proposals depend on numerous factors, such as the feasibility of implementation, long-term usefulness, etc. Of course, in the case of Darfur, it is particularly difficult to argue what intervening steps should have been taken, specifically by the Sudanese government, in light of the allegations that the Sudanese government has intended to neglect Darfur, or even has intended for the current conflict to occur.

Possible actions which might prevent Malthusian pressures may be roughly placed in two categories: those which increase the quantities of resources, and those which are concerned with maintaining a sustainable population, and preventing excess population growth. Examples of the former type of solution would include removing or replacing the activities which cause environmental degradation, a primary cause of decreasing yield, as well as increasing the amount of resource available through means such as foreign aid. Examples of the latter type of solution would be those aimed at decreasing fertility rates, as well as decreasing the overall population of the Darfur region.

Because much of the problem concerning resource shortages can be traced to decreasing yields as a result of anthropogenic ecological degradation, sustainable agricultural practices are of critical importance for Darfur, and indeed, the entire Sahel region. More sustainable forms of animal rearing would contribute substantially to decreasing the damage caused by current animal husbandry practices. Nomadic pastoralism has been deemed a more appropriate form of raising livestock for much of Darfur (Fuller 221-222). Attempts to reduce overgrazing or other damage caused by the animals, where sedentary animal raising is appropriate, would also aid in lessening land degradation. Properly planned, environmentally suitable, and sustainable farming techniques are also necessary to decreasing ongoing land degradation and ensure long-term soil health. The use of proper fallow periods, allowing the land to regenerate, is crucial to maintaining soil fertility. In addition, soil fertility management must be considered (Ayoub 489). The use of chemical fertilizers must also be considered to increase yields. The use of fertilizers in Sudan is less than one-fifth the world average, and one-half of the average of sub-Saharan Africa (Ayoub 498). Because fertilizers are available, but are mistrusted, the solution may be as simple as raising public awareness (Ayoub 498). Long-term thought must be put into devising systems of agriculture which are both sustainable and appropriate. Large-scale mechanized agriculture is inappropriate for much of Darfur (D'Osouza and Shoham 530). More appropriate would be relying on crops which are best suited to the local climate, displaying traits such as drought resistance, as well as well as aiming research at finding methods to ensure sufficient yields, and preserving soil integrity (D'Osouza and Shoham 530). Proper and sustainable utilization of resources, particularly wood and other forms of naturally-occurring vegetative matter, is also of paramount importance to preserving land integrity, and preventing erosion and other forms of degradation. It is also necessary to encourage sustainable water use, as well as search for alternative water sources (D'Osouza and Shoham 530). Comprehensive land use policies, as well as region-specific research, land rehabilitation, and an approach which focuses more on ecosystems and sustainability (Ayoub, 498), are all crucial to preventing further ecological degradation, and rehabilitating already damaged land. In addition to preventing degradation of land quality, and thus productivity, it is possible to artificially increase the quantities of vital resources, such as through foreign aid. While this particular method is both somewhat controversial and problematic, as well as being infeasible in the long-term, it should be explored as well. It has been suggested several times (Richter et al. 340, D'Osouza and Shoham 516, 519) that a system of observation of vulnerable communities, as well as

establishment of early-warning systems for resource shortages are needed and should be established. Unfortunately, due to past problems with proper food distribution where food was not evenly or sufficiently distributed (Bush 10), properly planned and managed food distribution is critical. A pre-planned response strategy and government structure which can formulate and enact such a plan is one possible solution (D’Osouza and Shoham 528), and a comparable non-governmental organization or international body may also be appropriate.

In addition to resource production, population is the second key issue in avoiding Malthusian pressures. Reducing the rate of population growth by decreasing fertility rates is one possible option, and is necessary for long-term sustainability of human populations in Darfur. This might be achieved through more widespread use of birth control, or some form of public awareness campaign. Even if population growth were to significantly decrease, however, much of Darfur is still considered to be overpopulated. Indeed, even a growth rate of zero would still leave the Darfur region severely overpopulated. Therefore, the only realistic and acceptable option seems to be permanent resettlement. Fuller suggests several strategies for resettlement, as well as determining that many individuals would be willing to permanently leave Darfur, in particular, northern Darfur (223). Fuller suggests three possible methods of resettlement. Firstly, Fuller discusses the possibility of self-managed resettlement to Southern Darfur, where individuals would make whatever arrangements they could with previously existing communities. Secondly, Fuller discusses strategies where resettled populations might integrate into already existing communities. Finally, Fuller discusses the possibility of resettled individuals forming entirely new communities, in areas which have previously remained unoccupied (228-229).

Objections

Of course, there are numerous possible objections to the previous argument, and to the proposed solutions mentioned. Others have claimed that Malthusian pressures as a result of human activities and population growth alone cannot explain the occurrence of genocide, and that individual choices play a significant role in causing genocide (Richter et al. 336, 340). Further, it has been argued that “Malthusian pressures have not forced the hand of the perpetrators” (Richter et al 336). This fact is absolutely true, individuals must ultimately be considered to be responsible for their actions, and Malthusian pressures alone cannot cause genocide, or determine whether or not genocide occurs. However, it is not the intent of this essay to establish Malthusian pressures as the sole cause of genocide, only to identify them as one particular contributing factor among several. While Malthusian pressures cannot force the occurrence of genocide, they can contribute to circumstances which may make genocide more likely, or which perpetrators of genocide may use to their advantage, to incite genocide. Both of these are points which even Richter has conceded (Richter et al. 335, 336, 340).

In a related objection, others may claim that elimination of the problems of Malthusian pressures will not necessarily prevent genocide from occurring. As noted above, genocide is not directly caused by Malthusian pressures, and genocide cannot exist in the absence of decisions by people to commit it. Thus, the elimination of Malthusian pressures cannot prevent the occurrence of genocide when individuals are willing and able to commit it. However, while elimination of Malthusian pressures may not prevent genocide outright, it may reduce factors which contribute to genocide. It may result in a reduction in tensions conflict between groups facing these pressures. Further, removal of these pressures may remove circumstances which

perpetrators of genocide might attempt to use to their advantage in order to commit genocide, such as the aforementioned tensions or hostilities between groups. Thus, elimination of Malthusian pressures may not prevent genocide directly, but it may make genocide more difficult to perpetrate.

Others may claim that some of the proposals outlined above are either infeasible in the case of Darfur, or that the situation in Darfur has progressed beyond the point of which these proposals may be of any use. It is true that some of the proposals outlined above are infeasible in the case of Darfur, or even the whole of sub-Saharan Africa. The situation in Darfur is incredibly complex, and any potential solution to the ongoing conflict faces numerous hurdles, some of which may be too large for the proposals outlined above. Further, due to the complex factors involving regional, national, and international politics, implementing these solutions may be difficult, impossible, or of little to no use, especially in light of issues concerning Sudan's central government. However, these proposals are not intended to illustrate what might be done now to solve the problems facing Darfur, but rather, to illustrate which steps may have been taken in the past to avoid these problems, but were not. Indeed, the proposals outlined above alone could not solve the current situation in Darfur, unless other solutions were first found to the ongoing political issues. These proposals may be of use elsewhere, as the same issues facing Darfur (desertification, land and environmental degradation, overpopulation, and resource shortages) are being faced by other nations, both in sub-Saharan Africa, and worldwide.

Conclusion

The resource shortages faced in Darfur are largely a result of human activities, including ecological damage and land degradation as a result of unsustainable practices, and unsustainable population growth. As we have seen, these problems were, at least in theory, preventable, and had alternative actions been taken, Darfur may not have faced the Malthusian pressures which ultimately contributed to armed conflict, and eventually, ethnics cleansing. The use of sustainable and properly devised agricultural practices, public education, and methods to control population could have prevented ecological degradation and resource shortages leading to Malthusian pressures. Further, international involvement in detection and reaction to environmental degradation and resource shortages might have severely lessened the impact of both. Unfortunately, in the case of Darfur, these preventative measures are no longer an option by themselves, and additional steps must be taken to rectify the current situation with relation to religious and ethnic conflict, as well as the problems concerning the Sudanese government's involvement in the conflict. It is possible, and the hope of this author, that the proposed actions outlined above might be applied elsewhere, and may be used to help prevent similar results elsewhere in the world, and should the political, religious, and ethnic issues in Sudan be resolved, that these proposed actions may be useful in the adoption and continued use of sustainable practices, and of maintaining sustainable population levels in Darfur, thus avoiding the resource shortages and pressures which have plagued the region for so long.

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