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China: Decreasing the Threat of Land Degradation

Introduction:

Have you ever been hungry? I have felt pains of hunger. These feelings never last for very long but for over 980 million people this hunger may plague them for a very long time. These people are considered food insecure. This means that they do not have the means necessary to consistently provide food for the family. 980 million people around the world try to live off of less than \$1 a day (2007 Report). Most of these extremely low-wage earning families are subsistence farmers. They try to survive by consuming food that is produced either by crops or by livestock that they raise. Unfortunately a limited supply of food is being met with an increased demand, thus raising basic food prices worldwide and severely affecting these farmers.

One of the Millennium Goals that the United Nations has set, to be completed by 2015, is the eradication of extreme hunger and poverty. The benchmark for poverty is to reduce the number of people living on less than a dollar a day to 600 million. From 1990 this has dropped from 1.2 billion to the estimated 980 million of today. The other part of the goal is to reduce extreme hunger which calls for halving the number of food insecure by 2015 (2007 Report). However, results so far have been dismal, with only a few key areas showing much improvement, so much work needs to be done. These goals go hand in hand so they need to be dealt with together.

An increasing problem of land degradation is occurring in Eastern Asia. In the northern part of China and Mongolia, desertification is becoming a big issue. Every year the borders of the Gobi Desert shift and engulf more and more land each year. In the 1990's an estimated 2,000 square miles of Chinese farmland was lost to the Gobi each year. This increasing desert landscape is costing the Chinese government about 2.5 billion US dollars a year as well as the livelihood of the Chinese people who live in these regions. The reasons for this land degradation are many and this problem needs to be addressed.

Typical Family:

Although China has the largest living population, according to the United Nations Human Development Index, China ranks 81st of 177 countries. This index looks at literacy, poverty, and life expectancy among other things. The index also shows only 23% of the Chinese have access to fresh water, compared to 100% in the United States, which may cause problem when deciding where the water should be used, for agriculture or for personal use. The HDI also indicated that 8% of children (ages 0-5) are underweight which can be compared to only 2% of American children under five (Development Report). This malnutrition is most prevalent when the family is living in poverty which may stem from a decreasing agricultural market.

The Chinese people living in the northern regions of China are typically subsistence farmers. A typical family farm consists of about .65 hectares of land. This plot size is very small compared to the average United States farm size of 181 hectares. With over 200 million farms of comparable size, this translates to a very large agricultural work force. ("Agriculture in China"). About 43% of the Chinese work force is concentrated on agriculture. These farms commonly produce wheat, corn, millet, rice and cotton. (CIA China) Most farmers supplement these crops with livestock, typically goats for their lower cost but sometimes cows as well. The family may be composed of a mother and father and one child due

to China's current governmental policy for maintaining population stability. However this regulation doesn't apply to those living in rural regions so families may be larger in rural areas (two or three children).

Typically, a traditional Chinese diet has been primarily vegetarian -- featuring lots of vegetables, rice, and soybeans. Only about 20% of this diet is meat based. This may be due either to economic instability or people following Buddhist teachings about minimizing suffering of the animals. Many a time meat is substituted for imitation meat in the form of soy products that imitate the flavor of meat products. In recent years however, the intake of meats and fats has increased. This is attributed largely to the infiltration of Western fast food and diets. This trend could also be attributed to a growing Chinese middleclass who can afford such luxuries as eating out.

Whereas an urban Chinese citizen may have up to 11 years of schooling, the average Chinese farmer only gets about 7.3 years. Therefore their knowledge is extremely lacking, particularly in the sciences. Another common education problem facing Chinese farmers is the lack of skill training. Only 9% of rural farmers have gone past the initial 7 years of primary education to gain professional skill training and a very small 5% have received an agricultural degree ("Average Education"). These factors may lead many Chinese farmers to be unaware or incapable of dealing with the problem of land degradation.

Key Factors:

There exist many factors that affect land degradation and the case of China, desertification. One such factor is global warming. Global warming is defined as the overall increase in world temperatures which may be caused by additional heat being trapped in the atmosphere by greenhouse gases such as carbon dioxide. Climate change has caused a decrease in rainfall and a noticeable extension of the Gobi desert in China.

A consequence of rising temperatures is that Chinese rivers are drying up due to the lack of mountain glaciers. For every rise by 1° Celsius the amount of runoff from glaciers could decrease by 8%. Decreased rainfall and a lack of wet rivers are of serious concern for the Chinese subsistence farmers. Since the amount of water that can be used for agriculture and other purposes is diminishing, these activities are becoming harder and harder to accomplish. The International Water Management Institution states that the area of China most affected by desertification is in a state of physical water scarcity. This means that more than 75% of local rivers are being used by humans for varying reasons ("Water Stress"). This overuse of the river causes many problems with the local land including dry rivers, a lack of groundwater and problems of distribution. With water sources dwindling due to global warming, farmers must either cut down on their intake or change to more water friendly techniques or risk losing the scarce water that currently does exist.

Another key factor that contributes to the Chinese desertification problem is the overuse of land mainly overgrazing. Overgrazing is when plants are exposed to [livestock grazing](#) for extended periods of time, or without sufficient time in between to recover ("Overgrazing"). One reason for this in China is the recent increase in both human and livestock populations. In a span of 50 years the population of livestock has increased from a mere 10 million to 60 million. The land is not able to withstand such an increase and the carrying capacity of much of the land was exceeded. In one area, the estimated carrying capacity was 3.7 million, today the number of livestock actually grazing in that area has grown to 5.5 million (Knight). This severely stresses the land, reducing the amount of vegetation cover which allows for a higher rate of soil erosion and thus desertification.

The overuse of land stems from the lack of land ownership rights in China. Currently, most rural

farmlands are owned by the government and organized into communal lands. ("Farmers Rise in Challenge"). Although some farms are on lease, these farmers are in the minority. Since these farmers work in such collective holdings, there is no reason to cut back on the number of livestock. Since it isn't legally their own land, many of these herders graze on land intensively before moving on whereby another herd comes along. This constant degrading of vegetation is a factor in creating deserts. The other consequence of lack of land ownership is the lack of investment. Since the local government is in control of the land, they can choose to sell the land as needed without first consulting the farmers; so many farmers do not wish to invest money for fear of losing their land

Possible Solutions:

The issues of global warming, water scarcity and overgrazing are of serious concern for the subsistence farmers of China. By dealing with these three complex issues, the problems of water scarcity and land degradation should lessen in China during the coming 50 years.

Global warming is one of the major causes of water scarcity in not only China but also the world. Although this issue is global, it is of particular concern for the Chinese government. As of 2006, China is the largest emitter of greenhouse gases closely followed by the United States (6,200m tonnes of CO₂ last versus year 5,800m tonnes from the US) (Vidal). If the problems of global warming were to be solved, the issues of water scarcity would become less of a threat as well. Although agriculture would need to be wary of overdrawing from these sources, the threat of losing them wouldn't be present. Even though this isn't likely to happen in an instant, progress made by many different countries and organizations (Such as the United Nation's Kyoto Protocol) should make the threat of global warming a minor one in the next fifty years.

The lack of knowledge that many Chinese subsistence farmers share does play a role in the Gobi desertification. Although this issue is ever present for these farmers, many of them may not fully understand the present dangers and the actions needed to be taken to stop and even reverse the damage the desert is causing. This education would have to be provided by the government either at the local or state level. Although corporations or organizations would be acceptable means of communicating these issues, the Chinese government would be better able to understand the problems that the farmers are going through.

One thing that should be taught is the current problem with water. With much of the land turning to arid desert, the need for new water management techniques has never been greater. By showing the farmers proper water saving techniques, much more of this valuable commodity could be put to use and not lost by the sun's heat. One such low-cost technique would be water harvesting. Although water harvesting may imply a multitude of ideas, such as rooftop capture systems. One technique would most benefit Chinese subsistence farmers.

The best method for Chinese farmers would be contoured landscape. This is a fairly inexpensive way to better utilize the water that does fall on the Chinese farmers. By shaping the land around the farm, the water can be directed towards the places where it is needed most. This includes semi-circular mounds placed around plants on a slope so as to catch the water when it runs down. Many different contoured landscapes are being used around the world and it would be up to the educators to decide which would be the best for the farmers in their area.

Another lesson that must be taught to the farmers would be the dangers of large herd size. Although it may sound wonderful to have so much livestock, the stress that this is putting on the environment may not be worth it. By showing the relationship between herd size and desertification, that

could be a big enough of a deterrent for such large herds. Since some farmers maintain such numbers just because they can and draw in more money, it will be necessary for these farmers to cut back but not so much as to endanger their livelihood. Unfortunately many farmers may need these large herds to support their family, so this creates a particularly difficult problem.

Since the incentive of saving the environment may not be enough to deter farmers from large herd size, the Chinese government has to step up and either give incentives for farmers who reduce their herd size or exactly the opposite and punish them for it. The first method would be best for the subsistence farmers. If the government were to reward farmers who reduce their herd size in the form of a monetary value, then the problem of overgrazing should lessen. This compensation would allow farmers to gain something while losing some of the herd. Although still necessary for the farmers to be aware of this problem, it would be much less likely for the area to be driven into a desert state.

The other solution is to compel the farmers to give up their herds. One way to do this while also rewarding the farmer would be to give them land ownership rights. With farmers owning their land, they will be more apt to keep it in good conditions. This would include reducing the size of their herd to cope with the amount of land they are given.

Conclusion:

China is a diverse nation suffering from many problems. Since the world's largest population depends almost entirely on the farmers, their needs have to be a priority. As of now China is largely self sufficient in the food that they produce, rarely having to rely on the imports of other nations. However, problems of water scarcity, global warming, and land degradation are ever present and it is becoming harder and harder for China to depend on itself.

These problems cannot be solved overnight unfortunately. The government currently is playing a large role in the effort to reverse desertification by building the "Green Wall of China". This plan calls for over 9 million acres of forest to be planted to help stabilize and keep the soil in place. Although this vegetation wonder would be as large of a project as that of hosting the 2008 summer Olympics, many fear that this isn't the cure due to its large cost and possible consequences (requires too much water in a time of water scarcity). The Chinese government needs to call on its farmers to aid in this fight and not just by paying them to plant trees.

The one thing that these farmers do know how to do is farm. In this time of troubles however, these farmers need to transition from age old techniques to those of today. They cannot do this on their own and thus need guidance and education provided so that they too can fight the desert. The Green Wall is a great idea as long as it is not supported by farmers who are creating more deserts. It will be through the cooperation of the national and local governments, to better educate and supply the resources necessary, that the fight against the Gobi will end.

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