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## **Biofuels: Promises and Implications for Food Security in Developing Countries - China**

### **Introduction**

With a world so heavily dependent on oil, it becomes evident that biofuels are the future of energy for all the countries of the world. While producing large amounts of biofuels can minimize oil shortages; the issue becomes will a decrease in the food security of rural poor in developing countries occur. If more and more farm land is taken up by rapid urbanization, and the land being farmed is producing crops to be used for biofuels, what will the food security for many developing countries look like? This is a setback that, developing countries are faced with when the topic of biofuels comes up.

China is the largest populated country in the world. The urban population since 1978 has been rapidly increasing. The rural population in 1950 was 87 percent, now the rural population only accounts for only 57 percent of the population. That 30 percent population shift has caused an expansion in the cities ("Country Studies"). When this expansion occurs more and more arable land is going to waste. When this farm land is taken, many of the rural farmers are being displaced from their homes and land, and migrating to the cities. This migration has been the main cause for the increasing population, causing a vicious cycle. Though many of China's rural poor are being displaced there are still many who are still living in poverty. According to the World Bank 10 percent of China's population is living in rural poverty.

China's farmers face vast obstacles in farming. The land is communally owned by the government so acreage is limited. The availability of farm machinery is also limited. In addition to small acreage and limited machinery little of the crops grown are produced for sales; the majority of crops grown are used for food to feed the family. This is why the rural population living in poverty is so high; farmers do not produce enough crops for sale.

### **Down on the Farm**

Rural life in China differs from that in America. In America the rural areas are a place where families go to escape the fuss of city life and enjoy the outdoors. In China, it is just the opposite; the countryside is viewed as a dark place, full of poor people struggling for life. The farms of China surround the tens of thousands of villages that are scattered throughout the countryside. Many of these farms are on the outskirts of the large cities. The farms are communally owned by the government, and long term leased to the people. With 750 million Chinese living in rural China, 23.65 million are below the poverty line earning less than 700 Yuan (approximately 100 u.s. dollars) a year (Farmers' Average Annual Income).

The average family size varies in rural China because of China's One Child Policy (1979), limiting families to one child, which has exceptions for those living in rural areas. Under the policy the farming families are not subject to the law, but encouraged to have as many children as it takes to get a son, to work on the farm and inherit the farm work. Even with this most rural families have few children because of low income and food security. The average house is only four small rooms for every three people. Often several family members of same sex and different generations sleep in one bed. In many cases there can be three or more generations living together in one house (Rosenberg, Matt).

In rural China the village is the center of the farms. Farming families live in the village, and then travel, usually by foot, to their farm land 1-3 kilometers away. The family, though farming the land, does not own it. In the majority of the villages the government owns the land communally, leasing the land long term to the families. Most of these farms are 1-3 acres in size, growing: rice, wheat, potatoes, corn, soybeans, and other vegetables to feed their families while the excess is sold and traded in the markets of the cities (Wingfield-Hayes, Rupert).

The majority of income is from market goods; that is the vegetables, livestock or crafts sold in markets in the villages and the cities that neighbor the villages. According to the National Bureau of Statistics the average rural income as of 2005 is 3,255 Yuan (approximately 430 U.S. dollars) a year. The majority of the income goes towards food for the family, who often receive little meat (Fairbank, 17-18).

The majority of tilling, planting, and harvesting is done by hand, because of small acreage, although some farmers have made the move to technology using crude machines and tractors to aid in their agricultural production. Even with some farmers capitalizing on the technological advancements, it is still too expensive to own, operate, and maintain for the vast majority of the rural population.

Education in rural China is often a mere dream. For those born on a farm the only way to move to a city and succeed is an education. With the expense of forty dollars a year to attend school, which many cannot afford, many parents leave the village to find additional work to send children to school. Even with the expensive school costs it is still very hard to find adequate teachers for the rural schools. China's well schooled and qualified teachers all want to teach at the prestigious schools in the large cities, so the rural schools are left with the unqualified. In addition to the ill-equipped teachers the class sizes on average are 50-80 students per teacher, which does not allow one on one teaching and tutoring. With these obstacles in rural education only 20% of junior high students go on to high school, with almost none going on to the collegiate level (Ji Ma, Wei).

There are several barriers to increasing productivity and income. High taxes burden the farmers in China not allowing them enough funds to buy land if they lease, or purchase more land if they already own. This creates a catch 22; the farmer cannot buy more land because of the high taxes and low income, the only way for the farmer to increase income is to grow more crops and since the farmer cannot get more land he cannot grow more crops. Many farmers and farming families have this same problem and many have resorted to leaving the rural life, for the hopes of a better life in the big cities. In the last decade approximately 100 million rural Chinese have migrated for the urban life. Migrants have few social and economic rights, because of the system of hu kou (birthplace rights). This system is dysfunctional and unfair, and it is slowly being abolished (Ji Ma, Wie).

Furthermore, since many of the villages on the outskirts of the rapidly urbanizing cities are owned and run by the village's government, when these rapidly growing cities expand and property developers offer to buy the land from the village, the governors sell the land without consulting the villagers or distributing the money. In the last 20 years a total of 16 million acres have been lost to rapid urbanization. This forces the farmers to pick up their things and try to find a new farm or hope to make it in the big city (Wingfield-Hayes, Rupert).

### **Key Factor**

Formulating public policy initiatives to address increasing populations, rapid urbanization, and gender or cultural discrimination.

It is evident that when China is the largest populated country in the world that there will be rapid urbanization. This urbanization is happening so quickly that its cities are running out of room. This

forces property developers to move outward. What's the problem with moving outward and developing more and more land? With this urbanization comes loss of farming land. The land once farmed is now being turned into an urban development.

With urbanization, the family farmers of China have less and less land to farm. With less land to farm, comes less food and income to support the family. According to the World Bank, as of 2003, the population (rural) below the minimum level of dietary energy consumption is eleven percent. This is due to the decreasing of farmland and farmers, which in turn produces less and less food for the families. This issue has been forcing the farmers of rural China to migrate to the cities, which lessens the gross national output of crops, whether they are for food, export, or biofuels.

The current situation is severe. In the past two decades 16 million acres has been lost as a result of this urbanization. This has displaced millions of farmers to the urban life. This has been the trend since its open door policy began in 1978. In 1950 the percent of population living in urban areas was only thirteen percent, whereas now the urban population is 559 million or 43 percent of its total population. This change of 30 percent in 29 years is the reason the cities have been growing too fast. With the recurrent increase of urban population throughout the three decades it is apparent that this pattern of rapid urbanization will continue ("Country Studies").

If the developing of rural land is ended it will allow farming families to produce adequate crop for food and income. This will give the country's farming population more land to work with and more of a steady income. If the country needs to import less food products for consumption the farmers selling in the cities' markets will have less competition and more demand for their product, which equals higher income. It would not only increase the amount of food available to the rural families but the metropolitan population.

### **Biofuels Production: Affect on Factor and the Implementation of**

China has shown a great deal of enthusiasm in biofuels production in the past few years. Last year, it held a large international conference on biofuels at Beijing's Tsinghua University. Chinese scientists and government officials have also visited Brazil to learn more about the production, and determined that it would be the future of the country's energy. But at the end of 2006 China stated that it was reconsidering the production of biofuels due to a lack of food security. "Arguments have never ceased in the Chinese science community on biofuels," said a senior Chinese academic (Lee, Sunny).

Many of China's government officials, along with many economists of the world, believe that the production of biofuels will harm, not help, the poor. The thinking behind this is that the money generated from the production will not be seen by the poor farmers, and they will plummet further into food and financial insecurity. The veracity is just the opposite.

If family farms would start to produce more crops to produce biofuels, village governments would not be as willing to sell the land to property developers, and the national government could make laws to stop the urban developing of rural land with ease. This would keep the percent poor in rural China down. In addition there would be less rural migrations to the cities, lessening the urban poor. This ending of the rural migrants would benefit all social classes in China. With less people migrating and more farming there would be more crop production not only for biofuels, but for consumption helping the food insecurity.

The question comes what to grow to produce biofuels, yet help the farming families earn sufficient income, and obtain food security. The answer is sorghum, cassava, and sweet potatoes. With

the increase in the price of corn, China has recently chosen to use these three crops because, although they are food crops, they are not a staple food.

Sorghum is a crop best known as a grain, yet the sweet type is very rich in sugar, which when distilled produces ethanol. Sorghum is also a very adaptable crop, resistant to water scarce climates and un-rich soils. According to the Food and Agriculture Organization (FAO), of the U.N., China imports nearly two million tons of sugarcane each year. "Its water requirement (sorghum) is one third that of sugarcane, and its growing period is short enough to allow harvesting twice a year," says Peter Griffie of the FAO. "While sugarcane is propagated from stem cuttings, sweet sorghum is sown with seeds. Just 4.5 kilograms is enough for a hectare of land, compared to 4,500-6,000 kg of sugarcane cuttings ("Sweet Sorghum")."

Cassava and sweet potatoes are also high yield crops, and even though both crops are edible they are not a staple food source. "Their use as a raw material, as opposed to that of corn, won't create any artificial shortage of food products," said Sun Xiaohua, of China Daily. Along with sorghum, cassava and sweet potatoes are well suited to grow in China's terrain (Xiaohua, Sun).

If more family farmers in China grew and harvested sorghum, cassava, and sweet potatoes; while still growing crops for family consumption, there would be more units of crop going towards the production of biofuels. The low price in sorghum, cassava, and sweet potatoes means more availability for growing. This would also help the rural farmers in that all three crops are well suited for growing in China. In addition, sorghum can be harvested twice a year, which means higher yield, and in turn higher income. With the higher income comes higher food security. In addition to going towards biofuels it could help the country avoid importing two million tons of sugarcane, and allow the country to import more food for consumption.

### **Who Will Help**

According to the Food and Agriculture Organization assistance to help China has already begun. The FAO assisted China's Ministry of Agriculture to set up sorghum pilot farms in several regions throughout China. In addition to setting up the test plots the FAO has provided specialists in sorghum and Brazilian experts in the production of ethanol, to help China get started. This is the kind of assistance needed not in only China, but in developing countries throughout the world.

In addition to the assistance from the world organizations like the FAO, and the World Bank, the countries' governments and corporations need to take some additional steps in pushing the producing of biofuels. The governments as stated earlier need to set public policies to counter act the rapid urbanization due to the increasing population. If set these policies will allow the country to have literally more room to work with.

The corporations producing the ethanol need to also go out and educate the rural farmers about high yield, ethanol producing crops, such as sorghum. If they help get the many farmers started they will see a drastic change and improvement in the production of biofuels, which in turn will give the farmers more food security resulting from the steady income.

### **Conclusion**

With the world's population increasing and urbanizing, more and more arable land is being wasted. This urban developing of farmland is not only hurting, but dimming the possibility of the people living with no fear of food insecurity. This creeping suburbia needs to be stopped immediately, through force of governmental law and public policy.

An end to the rapid urbanization will not be enough to increase productivity and food security. We as a people and the governments, with the help of world organizations, need to learn about and educate the importance of biofuel production; then we can finally make a shift towards becoming oil free. In addition to becoming oil free, this knowledge will provide the food security needed by developing countries. Once oil free; countries and its people will not have to fear the price of oil, as we do today. It will take time for scientists to make 100 percent oil free fuels usable, but with a larger rate of producing ethanol yielding crops, this day will soon come.

When the proper steps and time is taken to educate we will then see a change in the way the rural poor of the many developing countries of the world live. Along with this will be the hope of improving their living conditions and ease their rough way of life. This is not a far off aspiration or dream, with the technology and knowledge of the scientists and economists throughout the world; it now just comes down to implementation. If the governments implement this knowledge and technology they will see a large improvement in not only their economy, but also the standard of living for their rural poor.

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