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China: An Opportunity For Increased Food Security and Quality of Life

At the turn of the century, the United Nations adopted eight Millennium Development Goals in an effort to significantly help the world's poor by 2015. One of those goals is improving food security and economic development. The People's Republic of China has the largest population in the world according to the 2011 census, at 1,336,718,015 people ("China" *U.S. Department of State*). That number is 22% of the world's population. Despite its massive size and available resources, many people still suffer because the wealth of the country is not distributed evenly. China has made huge strides in its efforts to become more food secure and develop its economy. Since 1978, China has experienced continuous economic growth. Per capita income in 2008 had increased sixfold. In addition, according to national poverty line criteria, the number of people living in absolute poverty had gone from about 260 million to about 14 million ("Rural Poverty in China"). Still, China has many areas where more could be done. In the quest to become more food secure, it would be tragic to solve one problem only to create another. Of what use is it to supply people who are food insecure with food that will cause disease and ill health? If we are to make the best choices in deciding our future direction it makes sense to make use of the research and information that those before us have worked so hard to procure. Nutrition and improved eating behaviors are keys to China increasing both food security and quality of life.

T. Colin Campbell from Cornell University has spent his life researching nutrition and health. In his book, The China Study, he shares information that dispels many health myths. Although he says that an "enormous amount" of information has been collected about the links between what we eat and our health, much of the real science has been buried (Campbell). In the 1960s and the 1970s the term "protein gap" described the deficiency that developing countries had in comparison to developed countries. The problems of hunger and malnutrition seemed to stem from a lack of adequate supplies of protein (especially animal protein) to third-world children (Campbell). In addition, they saw the ingestion of aflatoxin--a highly carcinogenic substance produced by mold and fungus as a big concern. Scientists had believed that the high rates of liver cancer (and other diseases) resulted from a *deficiency* in protein, but results were showing that it was the children who were consuming the *most* protein that were getting liver cancer. One study Campbell found showed the effects of cancer growth stemmed not from aflatoxin but from animal protein (Campbell).

Although it is hard to believe, Campbell and others noticed similar effects in the Philippines. Campbell got funding from National Institutes of Health to further explore the protein effect on tumor development that resulted in his spending the next nineteen years researching the subject (Campbell). Among other things, one thing that he and his assistants consistently found was that "foci [precursors to tumors] development was almost entirely dependent on how much protein was consumed, regardless of how much aflatoxin was consumed!" (Campbell). When the animals exceeded what their bodies needed for growth, Campbell notes, "disease onset began" (Campbell). The protein used in all of the experiments to this point was casein, which comprises 87% of cow's milk protein. When plant protein was substituted for casein, it did not promote cancer growth—even at high intake levels.

Dr. Campbell was invited to participate in a landmark study that helped to solidify and further validate the research he had been involved with regarding cancer and nutrition. For twenty years, a partnership involving Cornell University, Oxford University, and the Chinese Academy of Preventative Medicine conducted what came to be called "The China Study". As a starting point, this study used data collected in the early 1970s by the Premier of China, Chou Enlai, who was dying of cancer. A nationwide survey,

it documented death rates for twelve different kinds of cancer for 880 million Chinese citizens in more than 2,400 counties. The data collected was converted into a “cancer atlas” that showed where certain types of diseases were high and where they were extremely low. Because 87% of the population is made up of the same ethnic group (Han people), the genetic make-up of the country is very similar. One of the questions the researchers asked was “why was there such a massive variation in cancer rates among different counties when genetic backgrounds were similar from place to place?” (Campbell) It made the likelihood that cancer resulted from environmental and/or lifestyle factors (rather than genetics) increase dramatically. Further, some of the variance between the highest rates and the lowest rates was more than 100 times (Campbell). Dr. Campbell and his Chinese colleagues worked together on a study (“The China Study”) that had never before been attempted in terms of “comprehensiveness, quality, and uniqueness” (Campbell). They were able to get 8,000 statistically significant associations between lifestyle, diet and disease variables but more importantly, Dr. Campbell was able to “test the principles that [he] discovered in the animal experiments . . . [and see if they were] consistent with the human experience in the real world” (Campbell).

Although the Premier of China had a personal interest in cancer, data on four dozen different kinds of disease was gathered. Campbell and his colleagues found that two groups of disease emerged: those typically found in more prosperous areas which he called “diseases of affluence” and those found in rural, less developed areas which he called “diseases of poverty” (Campbell). The diseases of affluence were: cancer (colon, lung, breast, leukemia, childhood brain, stomach, liver), diabetes, coronary heart disease. The diseases of poverty were: Pneumonia, intestinal obstruction, peptic ulcer, digestive disease, pulmonary tuberculosis, parasitic disease, rheumatic heart disease, metabolic and endocrine disease other than diabetes, diseases of pregnancy and many others (Campbell). Interestingly enough, each disease, in either list, tended to associate with diseases in its own list, but not with diseases in the opposite list. For example, people in an area that are suffering from Pneumonia also tended to suffer from digestive disease but did not have a high occurrence of cancer. The data shows that when a developing population accumulates wealth, people change what they eat and how they live. He says, “As wealth accumulated, more and more people die from “rich” diseases of affluence than “poor” diseases of poverty” (Campbell). These findings are invaluable to take into consideration as solutions are sought to improve both food security and quality of life for the poor.

A typical subsistence farm family in China is made up of a mother, father, and usually one child. Many times, the parents of the son will live with them as well. This is because of the One Child Policy, implemented by Deng Xiaoping in 1979. It restricted couples to only having one child. Repercussions for breaking this law were heavy taxes and fines. In 2007 this policy was relaxed so more people could have more children (Callick). For cultural and economic reasons the Chinese preferred sons, first because they could do “meaningful” work (and take care of their parents in their old age) and second, so they could carry on the family name. The One Child Policy is reported to have prevented over 400 million births since 1979 (People's Daily). The education laws in China say that all children who have reached the age of six are required to enroll in school. In certain areas, however, school can be postponed to the age of seven (“Primary Education”). Education is highly prized in Chinese culture but it is highly competitive and students are weeded out as they get older by a series of tests. In the 1950s, the Chinese government created simplified characters in an effort to combat illiteracy. Now most Chinese people 15 years of older can read and write (Edmonds). Private schools are also popular but very expensive. The Chinese have health care that is a combination of both traditional Chinese medicine, such as acupuncture and western medicine such as drugs and surgery of different types. In the late 1970s, reduced health care funding forced people to pay more for health care. This meant that for some poor people no longer had access to health care (Edmonds). A typical rural family had less access health care because of a lower income and longer distances from health centers and highly trained professionals. Recent reforms, however are in

place to change that and should help rural families access better health care. From now on, I will refer to a typical rural family in China as the “Wong” Family.

In the 1950s the Communist Party took control of China and forced farmers to work in production teams they called “communes”. In 1979, the Chinese government changed the commune system of farming to that of collectives. With collectives, individual contracts with families are made on a one- on- one basis. When they fulfill their contract with the collectives they can sell anything extra they grow or produce in the marketplace. This has created a real incentive for farmers to increase productivity and work harder. Many of the farms are small and barely produce enough to sustain a family. Because the government allows these small family units to work independently, they’re more empowered and are more committed to produce the highest yields they can (Edmonds). The use of new technologies has meant higher yields. The bottom line is more money for rural farmers and a better quality of life. The standard of living has risen over the last thirty years and many of the rural population are starting to have access to modern conveniences such as tvs, radios and sewing machines. Some villages have classes that teach them the latest scientific farming practices (Edmonds).

Even though things are improving for families like the Wongs, there is a growing gap between rural and urban residents. Incomes in urban areas are three times higher than rural incomes (“Rural Poverty in China”). In terms of nutrition, however, the Wong family still has an advantage simply because they have not been exposed to harmful eating habits. As progress in fighting “diseases of poverty” is made, families like the Wongs will do well if they can maintain a healthful diet that is composed of some meat, but mostly vegetables, rice, and noodles. If they can be educated, perhaps trends that indicate that with an increase of income comes a change of diet and lifestyle can be reversed. Unfortunately, studies show that “urban residents are . . . more likely to snack and to consume excessive amounts of fried foods than rural residents” (Wang Zhihong) and urban residents are shifting away from the steaming and boiling of food. This study showed that income is positively associated with high consumption of snacks and fried foods (Wang Zhihong). Further, as incomes rise, the consumption of meat and milk is on the rise. From the beginning of the 1970s to the mid 1990s, consumption of meat in developing countries almost tripled the increase in developed countries. The consumption of milk increased more than twice the increase that occurred in developed countries (Delgado). Fueling the increase are factors such as: population growth, urbanization, and income growth. These trends are expected to continue and are creating a “Livestock Revolution” (Delgado). In China, meat consumption in 1983 was 16 kg per capita. In 1997, it was 43 kg per capita. Milk consumption in 1983 was 3 kg per capita and in 1997, it was 8 kg per capita. Christopher L. Delgado with the International Food Policy Research Institute reports that, “aggregate consumption grows fastest where rapid population growth augments income and urban growth” (Delgado) If choices like these go on unchecked, families like the Wongs in developing countries will have to face the ugly consequences that “diseases of affluence” bring.

Weather is an important factor in agriculture. China’s challenge is to feed 22% of the world’s population using only 7% of the world’s arable lands (Shilong Piao). Trying to predict the weather is a challenge and even with satellites and almanacs helping farmers plan and harvest at the right time for maximum profit, there is still room for error. The weather is a huge factor affecting growing crops. During the next few decades many different factors will be affecting farming. Some of the major problems that we can anticipate in the future are due to climate change. In the future, there are world predictions of a rise of an “average temperature over a range of 1 to 3°C” (“Agriculture at a Crossroads”). This is a real problem for the rice farmers because of the higher average temperatures grain yields including rice are expected to fall. For instance, “rain-fed rice yield could be reduced by 5-12% in China for a 2° C rise in temperature” (“Agriculture at a Crossroads”). But along with higher temperatures comes “increase heat and drought stress in many of the current breadbaskets in China” (“Agriculture at a Crossroads”). Even further is the concern with water and the availability of it in the future. “Many climate impact studies project global

water problems in the near future unless appropriate action is taken to improve water management and increase water use efficiency.” (“Agriculture at a Crossroads”). Also, Climate change has another byproduct of extreme events such as “ floods, droughts and tropical cyclones . . . [being] more intense than before.” (“Agriculture at a Crossroads”).

There are even more fears on farmers minds as global warming increases because “pests and diseases are strongly influenced by seasonal weather patterns and changes in climate. Established pests may become more prevalent due to favorable conditions that include higher winter temperatures” (“Agriculture at a Crossroads”). While one cannot argue that climate change and other variables affect agriculture production—and will continue to do so in the future—the good news is that so far these effects have been small compared to the overall benefits that China has gained through improved agricultural practices and technology. “Rice, maize, and wheat yields in China have increased by 90%, 150%, and 240% over the last four decades” (Shilong Piao). These numbers are huge and probably not sustainable to this degree but they show that by using innovation and ingenuity, China (and the world) can learn to adapt and hopefully keep adapting to future problems. Rural families will need community and government support to adapt to changing conditions in the future. The Chinese government is already trying to help rural areas. Some of this help includes “agricultural tax exemptions . . . provision of subsidies for agricultural production and increased agricultural procurement prices, and expansion of social protection and security coverage” (“Rural Poverty in China”). This type of help will encourage and support families like the Wongs be successful in their efforts. To meet the challenge of creating food security and a higher quality of life, the ability to increase agricultural production is critical.

One of the ways to combat the challenges of providing food for China is to use technology to keep the food yields high and sustainable. One system developed by an innovative company, Roots Sustainable Agriculture Systems Ltd. is to irrigate by using Condensation Solar technology. Research has shown that their products provide “simple, reliable, low cost and environmentally friendly solutions... Field tests on 6 different crops, when compared with control, yielded a dramatic increase between 20% - 240% in production” (Roots) This technology enables one to “work off existing water and energy grids, or in parallel to existing irrigation.” (Roots). New technology like this will likely be able to help increase yields and help famers everywhere, including China.

Another technology, biotechnology, focuses on producing plants that resist pests, disease, and even drought. In many countries, “the loss of a crucial crop to pests, diseases or weather can mean the difference between life or death” (Prakash). Experts working closely with the World Health Organization, the Food and Agriculture Organization of the United Nations and the Organization for Economic Cooperation and Development have made strong statements supporting the safety of genetically modified crops (Prakash). Recently, six national science academies from the United States, Britain, Brazil, China, India, and Mexico along with the Third World Academy of Science issued a joint statement “endorsing biotechnology . . . urging companies, governments and charities to extend it to the developing world” (Prakash). They went on to stress the importance of this because for most of the world’s poor, “local production of food is the main economic activity. Without successful agriculture, these people will have neither employment nor the resources they need for a better life” (Prakash). One of China’s favorite crops-- rice, has been recently genetically modified. Trials using two strains of genetically modified rice show that “in the hands of the small farmers who dominate the country, these strains produce higher yields, consume less pesticide, and are better for the health of those farmers than non-GM strains” (A Sweet Rice Pudding). If technologies like these were focused on maximizing production of plant-based foods for human consumption there would be more healthy food available to all. Instead of feeding grain to animals to eat, Chinese people would not only have more food but would also be healthier as a result. Scaling up projects like these might be an important next step for the Chinese government.

Misconceptions that a “Western” diet of more meat, more dairy, more processed and “fast food” makes up the good life are important to address. To counter these prevalent beliefs, aggressive nutritional education and well as government programs will be needed. One idea is to have local celebrities endorse healthy eating and a healthy lifestyle. If celebrities like Yao Ming or Jackie Chan were to be involved in these educational activities, these efforts would be much more effective. Popular celebrities or sports figures have a lot of power and influence in Chinese culture. The assistance of international organizations such as the United Nations, the World Health Organization, government and business leaders around the world are also needed. Changing a “Livestock Revolution” to a “Whole Foods Revolution” is not easy—but then neither is fighting disease and death from what Campbell calls “nutritional extravagance” (Campbell). Campbell also says that “there are virtually no nutrients in animal-based foods that are not better provided by plants” (Campbell). Perhaps the focus of future food policies could look to funding and giving tax breaks to companies who grow and promote plant-based diet. Further, the Chinese government could tax unhealthy foods (such as highly processed food, meat, and dairy products) and then use that money to make healthy food more affordable. Development of programs and policies like these have a double benefit: not only are plant-based foods cheaper to produce but they also have enormous health benefits as well. Even with international, government, or business policies, it is ultimately a decision that families like the Wongs have to make. This is why nutritional education is so important.

During the last four decades, China has experienced phenomenal economic and agricultural gains. It has been able to increase living standards, food security, and reduce poverty for millions of its residents. In order to keep progressing in this effort the use of new technologies such as Condensation Solar Technology and genetically modified strains to increase yields is critical. China also participated in a landmark study that resulted in important finds regarding nutrition that has the potential to help increase both the health and quality of life for Chinese people. Much of this information has to do with misconceptions about animal-based protein in the diet. As Dr. Campbell said, “the story of protein is part science, part culture, and a good dose of mythology” (Campbell). As governments and business make decisions about future food policy, it is essential to take into consideration the growing research that clearly shows the huge benefits of a plant-based diet. It would be a tragedy to put the resources of a country into producing food for people that will, in the end, cause disease and death. Trading “diseases of poverty” for “diseases of affluence” is not progress. Studies clearly show that most of these diseases do not stem solely from our genes but from our lifestyle and diet choices. They are preventable. Nutritional education with the endorsement of celebrities or sports figures will increase awareness of this issue. In addition, the development of policies that would impose higher taxes on unhealthy foods and then use that money to subsidize healthy food may improve healthy food choices. Heart disease, cancer, diabetes, obesity and other diseases cost the developed world billions of dollars in health care a year. This is not a legacy that should be passed on to less developed countries. Achieving the eight Millennium Development Goals will take an enormous effort by everyone. Educating government, business, and communities leaders could result in a change of direction that would achieve both increased food security as well as quality of life.

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