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Nepal: Introduction of a New Crop

Nepal is a landlocked country between India and China whose standard of living has increased in small amounts. Nepal has made significant progress in the areas of education and health. Poverty levels have decreased from 31.5% in 2003 to 13% in 2010 (“Third Nepal Living Standard-2010”). Throughout Nepal’s struggle for better conditions, it has faced political uncertainty, a crumbling economy, reduction of the level of capital expenditure, and many other problems. The percentage of households who own a home has decreased from 91.6% in 2003 to 89.7% in 2010 (“Third Nepal Living Standard-2010”). The percentage of households renting houses has increased from 5.4% to 7.8% in 2010 (“Third Nepal Living Standard-2010”). Another improvement is the number of households who have access to electricity. This number has almost doubled from 37.2% in 2003 to 69.9% in 2010 (“Third Nepal Living Standard-2010”). Even though many families had access to power, it is not always available, lasting from one to 18 hours a day. Power lasted from one hour to eighteen hours a day. Although many households do not have running water, those with access to potable water marginally increased from 81.2% in 2003 to 83% in 2010 (“Third Nepal Living Standard-2010”). The increase may be small, but even a small increase is better than nothing. Fifty-four percent of Nepal’s population lives on less than \$1.25 a day. Unlike those in Nepal, the typical American has access to basics like food, water and electricity. Compared to the Nepalese the majority of Americans can be said to lead “comfortable” lives. About 3.5 million people in Nepal are moderately to severely food insecure, and forty-one percent of Nepal’s population is undernourished. There are some factors contributing to Nepal’s problems over which humans have no control. Natural disasters such as floods and droughts cannot be controlled, but steps could be taken to provide relief after natural disasters happen.

Malnutrition is a serious problem in Nepal. Half of the population of Nepalese children under the age five are chronically malnourished (“Nepal:Overview”), and thirteen percent of the population suffers from acute malnutrition (“Nepal:Overview”). Malnutrition is a general term that encompasses several problems: under-nutrition, over-nutrition, and micronutrient deficiency. Fifty-five million children under the age of five worldwide suffer from acute malnutrition (“What is acute malnutrition”). Wasting is a main characteristic of acute malnutrition (Young & Jaspars). Wasting is caused by a rapid weight loss, and is more common in infants and young children. Children can recover from wasting once they eat a proper amount of food (Young & Jaspars). Many communities in Nepal have malnutrition rates larger than 15% (“Nepal:Overview”); this constitutes an emergency situation. Children can be victims of irreversible mental or physical problems that are caused by the lasting effects of malnutrition. There is no excuse for allowing anyone in the world to suffer from malnutrition when the solution is readily available. Those living in industrialized countries, like the United States, are very lucky. The plight of others needs to be addressed and eradicated.

A typical Nepalese rural household has little or no access to primary health care, education, safe water or sanitation services. The Gross National Income per capita is less than 531 dollars, and over 30% of the population of Nepal lives on less than \$12 per month. Eighty percent of the population lives in rural areas and depends upon farming to make a living. The largest concentration of poor rural Nepalese live in the Mid-Western and Far-Western regions of Nepal. Most of the rural population is made up of large, illiterate families that are landless or own a very small amount of land. The average amount of land owned per household is 0.8 hectares, about two acres. Families in rural Nepal are close and work together as a unit. The divorce rate in rural communities is much lower than the rates in urban areas. Child abuse is

common to rural families who have relationships such as a stepfather or stepmother. Discrimination against girls is a cause of child abuse. Girls usually have a harder time in abusive families than boys.

A typical Nepalese farm family has about six members (“Farm family: Nepal”). This makes sense as the higher number of children you had, eventually, the more workers you would have for your farm. Homes are made mostly of mud, bricks, and straw with dirt floors and no running water or proper sanitation. Usually, a farmer will own about 0.5 hectares of land to farm. The farmer might also own a small amount of livestock. All family members share the amount of work. Women, who work up to 11 hours a day, usually have longer workdays than men, who only work up to eight (“Farm family:Nepal”). Even ten to fourteen year-old children work four to seven hours a day. Farm families grows crops such as maize, millet, rice, and wheat. The crops grown will amount to 60% of the family’s food. The rest is bought from the family’s earnings.

The introduction of a new crop could help alleviate Nepal’s malnutrition problem. *Salvia columbariae*, more commonly known as the Chia plant, belongs to the mint family Lamiaceae (“*Salvia columbariae*”). The Chia plant can grow anywhere from 10 to 50 centimeters in height (“*Salvia columbariae*”). It has flowers that produce tiny seeds. and each flower houses approximately 13 Chia seeds (“How to Plant and Harvest Chia Seeds”). Chia seeds are not only nutritious, containing Omega-3 fatty acids, antioxidants, protein, calcium, and dietary fiber, but they are also energizing. Chia seeds are easily digestible and even reduce food cravings. Because of their small size, Chia seeds are easily transportable, and a large amount of Chia seeds can occupy a small amount of space. Chia seeds would be useful for sherpas in the Himalayas. Long journeys would be made easier if the amount of baggage, thereby the weight, carried was reduced. A tablespoon of Chia seeds is enough to sustain a typical person for 24 hours, and one-pound bag is enough to sustain a person for several weeks.

Salvia columbariae is native to western North America. It grows anywhere from California, Nevada, Arizona, Utah, and Northwestern Mexico. In recent years, Chia populations have declined because of urban development, overgrazing, and fire suppression. Chia seeds have been a food staple for many Native American tribes on the Pacific Coast such as the Salinan, Costanoan and Chumash as well as the inland Paiute, Maidu, and Kawaiisu. In ancient Mexico, Chia plants were cultivated alongside corn as many as 600 years ago. Chia plants are able to grow in a multitude of different environments. This plant does very well after fires. It sprouts after most plants around it have died. Chia can be found in open, grassy areas of woodlands, sandy washes, dry plains, hillsides, and even gravelly, disturbed sites. Native Chia plants are found at elevations below 1,200 meters (3,937 feet) but can be found up to 2,100 meters (6,889 feet) (“How to Plant and Harvest Chia Seeds”). In the appropriate environment, Chia is very versatile. Chia has adapted to arid conditions and soils that have low fertility levels. That is why I believe Chia will grow well in Nepal. Nepal has a multitude of soils that would be beneficial for growing Chia. Gravelly soil is found at the foot of the Churia Hills. Normally, this soil would not be very good for farming, but because of its adaptability, Chia is able to grow in gravelly or disturbed soil. The Chia plant can also grow well in the sandy soil that can be found in the mid-hill valleys of Kathmandu and Pakhara.

The Chia seed has many nutritious benefits. They can be eaten by themselves, or mixed with other foods. Chia seeds have more Omega-3 than salmon, more antioxidants than blueberries, more calcium than 2% milk, and more protein, fiber, and calcium than flax seeds (“What are Chia Seeds?”). In Mexico, a beverage called Chia fresca is made by putting Chia seeds into water or juice. Chia seeds also create a gel-like substance, which can be used instead of oils and fats in foods. Chia seeds are filling and keep a person full for a long time. The seeds keep a body hydrated longer than drinking water (Anderson). When eaten, the Chia seeds will also cleanse your body. Toxins will be removed and you will look and feel healthier (“Benefits of Chia Seeds”). Many people who eat Chia seeds say that they feel younger after they eat them. Another beneficial feature of the Chia seed is that it lowers blood pressure levels. This is beneficial to people who have high blood pressure or diabetes. This may be dangerous for people who

already have low blood pressure. If too many Chia seeds are eaten by those with low blood pressure, blood pressure could lower to dangerous levels.

By introducing this new crop, farmers will not only acquire another source of food, but will also be able to sell it for additional income. The Chia seeds will improve the overall health and well-being of the Nepalese. Because of the many nutritional benefits of Chia, the problems faced in Nepal, such as malnourishment, may be eradicated. The Chia seeds will bring more money into the Nepalese people's homes, and therefore they will be able to afford more things. Families may even be able to afford products that are considered luxuries in Nepal. The additional income produced by the sale of Chia seeds will improve the country's standard of living. The Gross National Income per capita will increase from 531 dollars, therefore helping the economy to improve.

The introduction of Chia seeds into the Nepalese diet will be especially beneficial to those who live and work in mountains such as sherpas who must travel a lot, and therefore must carry the smallest amount of supplies. On a journey, the amount of space occupied by food could be reduced by more than half if Chia seeds were taken instead of a variety of other foods. Chia seeds don't even need to be cooked; they can be eaten fresh from the Chia plant. A small amount of space can be occupied with an amount of Chia seeds that can keep one sustained for weeks. As stated earlier, one tablespoon of Chia seeds is enough to sustain a human for a full 24 hours.

The Chia plant is hardy. Once the plants sprout, they require very little water to survive. These plants do not wither because of most droughts. Their natural habitat is dry, and they even grow in some deserts. The flowers of the Chia plant usually bloom in late spring or early summer. In the Chia's native habitat of California as well as in Nepal, that would be from March through June. The Chia seeds would be able to withstand the droughts that Nepal endures. The biggest enemy of the Chia plants is floods because the plants cannot withstand a lot of water. Heavy rain that results in flooding and landslides could be a large problem for growing Chia seeds. Chia farmers will have to take the same measures as any other farmer does to protect their crops. Monsoon season in Nepal is in the summer, between June and August. The Chia plant's flowers bloom from March through June, so most of the Chia blooms will be safe from flooding. Farmers may have to plant the Chia in raised beds to prevent maximum damage from flooding. To harvest the seeds from the flower, you must wait until the bloom dries and turns yellow, but before the seeds start to fall out of the bloom on their own. The Chia is an annual plant, so the easiest way to harvest them is to pull the entire plant out of the ground, and beat the plant on the inside of a container to remove the seeds.

The Chia plant is environmentally friendly. When Chia is harvested, the entire plant is ripped from the ground, so no potentially harmful pieces get left behind. Chia plants do not put anything harmful into the soil. Farmers must till the soil once the Chia plants are harvested, but they will be used to doing this from growing other crops. To start growing Chia plants, all farmers must do is scatter the seeds on top of the soil. It would be helpful for the Chia seeds if the farmers press the seeds lightly into the soil after scattering them. Birds and other seed eating animals will take advantage of a farmer's carelessness. The animals could completely devastate a farmer's crop. This is a danger farmers face every time they grow crops. They take this risk because it is their way of living. To prevent maximum damage from foraging animals, farmers could put mesh nets around the Chia plant beds. Because of how poor Nepal is, farmers may not have accessibility to these nets. Farmers could use anything readily available to make a protective device to ward off hungry animals.

The introduction of Chia in Nepalese agriculture must start with an educational outreach program. Once the people of Nepal understand the benefits of this crop, they will be anxious to start growing Chia. Rural communities interested in growing Chia must be thoroughly informed about how to properly grow and care for the plants. Otherwise, this new crop will not flourish. The introduction of Chia in Nepal would

entail the permission and, perhaps, the assistance of the national government. No country would be lax about allowing another country to introduce something that might pose a threat to national security. The government will most likely want to know every useful piece of information about not only the Chia plant, but also about the research group introducing it. After the government accepts the idea, it would be best to only introduce the crop to a small number of communities at first. At these experimental farms the crop and the people of these communities should be monitored to see how the plant grows, and how the people react to the introduction of this new plant. By introducing the crop to a small number of communities, the effects of any unforeseen problem or crop failure, would be limited.

I believe the CGIAR (originally the Consultative Group on International Agricultural Research) would be glad to help with the introduction of Chia to Nepal. The CGIAR is actually an alliance that unites agricultural research organizations involved in research for sustainable development with donors that fund research programs (“CGIAR”). The CGIAR Consortium of International Agricultural Research Centers has 15 members which enact the work in collaboration with hundreds of partner organizations, including national and regional agricultural research institutes (“CGIAR”). The CGIAR currently supports a total of 14 research centers and one intergovernmental research center (“CGIAR”). CGIAR’s main vision is to “reduce poverty and hunger, improve human health and nutrition, and enhance ecosystem resilience through high-quality international agricultural research, partnership and leadership” (“CGIAR”). I think recruiting the CGIAR to help with the introduction of Chia seeds to Nepal would be a very good choice. The CGIAR has the resources to enact my plan.

CGIAR would have to work closely with the Nepalese government in order to ensure the safety of Chia seeds. I think it makes sense that any government should be wary of the introduction of a new crop from another country. The Nepalese government may see it unfit or useless to introduce the seeds. Chia has been known to grow wildly, so it has the possibility to become an invasive species (“The Chia Challenge: Invasive Species or Wonder Crop?”) This factor may be a hindrance to the introduction in Nepal. The government of Nepal may not be eager to introduce a crop that has the possibility to be invasive into their ecosystem. The researchers sent to Nepal to introduce this crop would have to work closely with the local government in order to assure them that the Chia is a safe plant. Once the government has given its consent, the researchers will select a prime location in Nepal for the cultivation of Chia. The researchers will then choose a small community in which to integrate the Chia in their daily lives. The farmers of the community will be given extensive knowledge of the Chia and how to ensure its successful cultivation. This will be a trial in which the researchers will observe the process and results. This should be done several times in different communities across Nepal to ensure that Chia will be successful. If deemed successful, the researchers will begin the integration process for the whole of Nepal which will make Chia readily available to farmers across Nepal.

I believe my research on Chia seeds will help many people in Nepal. Far too many Nepalese people live in extreme poverty, and the people desperately need proper nourishment. The Chia seed is extremely beneficial and could help many people. Chia seeds will not only combat malnourishment, but also obesity. Strange as it may seem, obesity and malnourishment often go hand in hand in poor countries. The living conditions of the Nepalese poor are terrible; households have no power, running water, or proper sanitation. I am confident that the introduction of the Chia plant to Nepal will not only increase the overall health of the Nepalese people, but also boost its economy. The sale of Chia seeds will put more money into the economy and also increase the income of farming families. When the Gross National Income per capita is about \$530, any extra income is beneficial. People have obviously found a way to make a living in this impoverished country through farming. With technical assistance, farmers could adapt their farming techniques to grow Chia. This small but amazing plant will reduce the percent of people who are malnourished and change their lives. Nothing is more important than improving a country’s overall standard of living. Nepal’s success would inspire other countries with similar

malnutrition problems to do likewise. A problem might begin when technologically advanced countries find out how useful this plant is. The more advanced countries might start to out-compete their small third world brothers. The eradication of malnutrition may take a long time, but if we continue to probe young minds for ideas, a solution will be found for every major problem in the world.

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