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## Benefits of the Avocado in India

India is a democratic country of hardship and hunger, where politicians decide if the people get food. Politicians do not seem to care about research or making agriculture better. How can an avocado be the promise of the future for India? Having more nutrition than any other fruit in the New World, it is considered to be the most important contribution to human diet in the New World. Avocados have the highest energy value of any fruit. It also is rich in proteins and fat, and yet low in carbohydrates. Holding many valuable vitamins and minerals, the avocado is the fruit of promise in India. India is very abundant in many agricultural resources. India's most important economic impact is agriculture, which provides about two-thirds of the population with work in India. Almost nine percent of India's exports are agriculture related. Agriculture activity accounts for about 43 % of the land in India. Rural villages house 650,000,000 of India's 1,000,000,000 people. Population is governed by the central government of India who makes policies, resources allocations, and food and price policies. Constitutionally, the states are responsible for agriculture. India is home to the world's largest cattle population with 193,000,000 cattle. There is also more water buffalo and camels than any other country. Goats and sheep also have large populations in India. Increasing dramatically from the past, dairy and poultry markets now make higher returns than crop farming. Over the last four decades, significant progress in agriculture has been made in India.

Progress is seen in India in many different ways over the years. One success in India is the self-sufficient grain production with substantial reserve of grain. Additional areas have been cultivated, irrigation facilities have been extended, high yielding variety of seeds are being used, and water management are just a few reasons there has been increased agricultural production. Although, agriculture production seems to be improving, a closer look you will find that population in India is also increasing. Productivity has to increase because no new land is fit to cultivate in India. Increased yield rates are needed due to the increased population. Almost sixty percent of India's population is struggling financially to survive, with little or no savings. Unexpected costs make families rely on either no-interest loans from neighbors or outrageously high interest rates set by creditors. Medical expenses cause hardships who instead of paying for treatments and medicines, must suffer through the pain until enough funds are present.

A typical family in India struggles with malnutrition and poverty. An example of a typical low-income family is Kalayvani and her husband Krishna and their children. Kalayvani and Krishna work as laborers in a vegetable garden. They have accumulated significant debt against their landlord, who also owns the house they live in and the field they work in. However, the landlord doesn't charge any rent or interest to the money that he lends out. Though that may seem as an advantage, Kalayvani and Krishna only earn a combined amount of rupees (Rs) of 3,800 (US \$79) per month. Monthly expenses that are taken from the monthly payment include many needed things. This includes the following: School fees- Rs 483 (\$10), Medical care- Rs 300 (\$6), Food- Rs 2,000 (\$41) and debt payment is Rs 550 (\$12). Additionally, they take home less because debt payments, that vary from month to month, paid to the landlord for loans to buy needed goods. That amount that is taken home doesn't even begin to cover medical expenses needed by Kalayvani, who suffers from chronic typhoid, and Krishna, who suffers from an ulcer. The expenses continue to pile on as they struggle to pay for their children's education. Kalayvani is positive that if her children receive an education, it will provide for a better life than that of a field laborer. Even when two of her children cost extra to send to an English-language school, she believes it is worth her sacrifice. Not all children are that fortunate. In 1993, 45 children in Jawhar died of malnutrition in one week. At least 200,000,000 people earn less than \$1 a day. Programs are in place to help the poor people in India, but problems still arise. A 2005 study by New Delhi economists Surjit Bhalla and Nirtha Das, found that less than 27 cents of every \$1 that was to go to the poor actually reaches the poor. Progress however is present even if slowly and gradually. Indian government census statistics show that the

population living on less than a \$1 a day has dropped from 26% of the population in 1999 to about 20% currently. A 7% economic growth rate in the recent years has been made possible because of a combination of projects by non-governmental organizations, local villagers' efforts, and grant from the government. However through these great strides toward improvement much is still needed for the typical family. Low-income families struggle to make ends meet with limited resources. For example, most low-income families only eat two meals a day. Vegetables, fruit and milk are not present in the diets of many.

Parliament endorsed India's National Health Policy in 1983. The National Health Policy is committed to providing health services. Critics point out how the policy lacks specific methods to achieve such broad goals. Problems include: failure to integrate health services with wider economic and social development; poor involvement at local level; and low national support; and sanitation. Another problem is that health care spending in the government decreased, while private-sector spending was around 1.5 times as much as government spending. At times the government has issued an approach to help India meet nutritional needs. An example of government approaching nutritional needs is when the Supreme Court of India directed all state governments to introduce cooked mid-day meals in primary schools within six months of the landmark order dated on November 28, 2001. Though it is meant with the best of intent of creating a healthy nutrition program for children, complications outweigh the strengths. One school complained that a makeshift stove cooks the mid-day meal right next to the students. The cook uses inadequate utensils and uses young children to cut the vegetables. The teacher also complains that no learning takes place in the afternoon because of the filth in the classroom after mid-day meals. States supporting less money on mid-day meals than other states also is proving to be a problem. This would impact the timeliness and the quality of grain delivered to the primary schools. There are benefits of school programs. Tamil Nadu is home to nine primary schools that believe the mid-day meal addition has been a much-needed benefit of primary school education. Rice and sambhar are served every day and different vegetables are used over the week. Benefits of mid-day meal include: increase in school attendance, elimination of classroom hunger and a social equality. The mid-day meal program is just one example of how a nutritional benefit leads to other improvements in life.

Avocado is useful in many different ways beneficial to the Indians. It has high nutritional density, is a source of protein, fiber, major antioxidants, stroke prevention, and is used as a baby food. The avocado contains about twice of our daily needs for vitamins C, E, and beta-carotene as its calorie proportion. Rich in copper and iron, two mineral constituents of antioxidant enzymes, avocados again prove their nutritional quality. Potassium is also high in avocados, as it is has one of the highest potassium rates in tropical and non-tropical fruits and vegetables. A benefit of potassium is a 40% reduction in stroke risk with 400 mg of potassium, supplied in less than one-half of an avocado. The avocado is associated with lower blood pressure because it is high in monounsaturated fat. All amino acids are found in the avocado however not in ideal portions. Avocado being used in baby foods has many benefits including containing more potassium than 45 other fruits, juices or vegetables. They are also one of the only fruits or vegetables, which contain monounsaturated fats, essential for a baby's development. Another benefit is avocados have been shown to maintain good cholesterol while reducing bad cholesterol. One half of a Hass avocado contains about 80 grams of edible fruit has a significant percentage of the daily nutritional needs of children ages 7 to 10. The Hass, Fuerte and Green varieties are promising in India.

Avocados are grown scattered in southern tropical states like Tamil Nadu, Kerala, Karnataka, and Mararshtha. Also popular in the northeastern Himalayan state of Sikkim on hill slopes at elevations if 800-1,600 meters. Avocados are grown at higher elevations frequently, to prevent soil erosion. An avocado can withstand poor drainage and water logging. Avocados cannot tolerate northern India's hot dry winds and frosts, typically grown in tropical or semitropical areas with rainfall in summer and humid, subtropical rainfall areas. Intolerant to saline conditions and optimum range of pH is from 5 to 7, are characteristics of this unique fruit. The climate zone of avocados is from true tropical to warmer parts of the temperate zone.

Currently avocados are not a commercial crop. It is difficult for the avocado to compete against the other fruit crops such as banana, mango, and grapes. There is a lack of awareness of the nutritional quality of the avocado. The avocado is an example of the paradox of obesity and hunger. High enough in calories to help India's people who are underweight, and yet it is still considered to be a weight loss tool. The monounsaturated fat speeds up the metabolic rate, as compared with saturated fat. High fat content gives a quicker feeling of "fullness", reducing overeating. Even though a high fat content of most avocados (up to 90% of its calories) makes it look like it would be negative on health, it has over twice as many calories per unit weight as does carbohydrate or protein. When the body burns calories when storing calories from carbohydrate or proteins, it burns about three times as much when it burns calories from fat stored. So the avocado has its many benefits in combating malnutrition and obesity.

Production and quality of avocados can be increased if a definite variety is requested by India. With so many varieties of crops, it creates an inconsistent quality to market, poor fruit types, and drives the market down. An avocado is propagated through seeds. The seeds are only viable for 2 to 3 weeks but the time length can be increased if storing the seed in dry peat or sand. All avocados trees in Sikkim are grown as seedlings. Seeds from mature fruits are sown in a nursery or in polyethylene bags. These seedling trees at 10-15 years will produce 300 to 400 fruits. Other trees will yield from about 100 to 500 fruits per tree. Establishment of selected varieties of clones is due to budding or grafting in vegetative propagation. India has no commercial nursery participating in nursery production of avocado planting material. Plantations are scattered and not well organized. High quality nursery plants of select varieties and systematic planting in all of India can help make avocados popular in India. The fruit needs to be picked carefully, as they do not ripen on the tree. Avocados should be harvested when they are hard and have 12 percent minimum oil content. The hard fruit s allowed ripening during transportation and distribution. Transport time maximum is 14 days, though if kept at 5.5 to 8 degrees Celsius. The possibility of expanding the out-of-season production may be a reality with the proper varieties of selections. Avocados can be marketed in the country easily, especially with the growing tourist industry. The fruit may also have good export potential. Due to the easy accessibility of attaining other fruits, many common people will choose another fruit. Taste may also influence Indians to not choose the avocado. Fruits of 250 to 300 grams in size are preferred in India. Similar in size, color and quality of avocados grown in India is comparable with those grown elsewhere. It is expected that the high nutritional value will influence people in India to market the avocado. The tribal population of the Kikkim have wide acceptance for the avocado. May the Kikkim set the example and show how the avocado can be a potential fruit crop in India.

Avocados can be gateway fruit to the future in India. Even if it is not currently a commercial crop, there are benefits that can be obtained for the people of India. There are many nutritional benefits for the malnourished India. However, many problems are in the way to have a constant supply of avocados in India. Researchers have proven that avocados must grow in a pH range of 5-7. Because of that and the characteristics of a hot and yet wet climate, avocados can only grow in parts of India. Grown in Southern states of India and in the hilly Northeastern state of Sikkim, the avocado is limited. Many different varieties of the avocado hurt their market potential because the varieties result in an inconsistent quality in the fruit. Research is needed to identify one variety that has the best yield and is a high quality fruit. If one variety is the focus of India then all of the avocado producers can focus their attention to producing the best quality fruit of that certain variety. With the focus tuned to only one variety of avocados, a market can be established. A better crop will slowly emerge that will hold more nutritional benefits and may even one day be a high enough quality product to export. Not only could the higher nutritional value avocado could benefit the health of the people of India, it will generate a new source of income to the country.

Avocados have many benefits for the people of India. Even though it is not a popular crop, with the right advancements it can become very successful for India. What advancements are needed to make the full use of the potential the avocado holds? Researchers believe that more research and government spending needs to happen to increase the productivity and quality of the avocado. As the population in India increases, the demand will naturally increase. Increased productivity will also make avocados

available to consume for the nutritional benefits. Not only does the crop production of avocados need to be increased, also the quality needs to improve. Researchers believe that if only one of the many different varieties of the avocado in India was the main variety of avocado, it would make the avocado a higher quality of fruit. Instead of many hybrid varieties which each had their benefits and problems, the focus of avocado producers would be for one high quality pure fruit. These advancements would make the avocado even possible to be exported, which would help the poverty rate in India. How is the government and researchers focusing on the avocado going to help the advancement of the avocado? The government needs to encourage and pay a research staff to research all aspects of the avocado. Researchers should make a judgment of which variety of avocado would be the best variety implemented all over the country. Factors for deciding the variety of avocado include: flexibility to weather conditions, the quality of fruit, percentage for surviving in different environments in India, and how marketable the avocado variety is. After researchers make a decision on what variety of avocado is the best decision to concentrate on to make a higher quality of fruit, the government should support the decision. The government can encourage growing the one variety of avocados by creating benefits for avocado producers who grow the variety. Money should be given to producers who produce a certain amount stated high quality avocado of the required variety. The more high quality avocados grown by the producer should be given more money. How is the producer going to learn about the variety of avocado being encouraged? The government should hire people knowledgeable in avocados and agriculture to teach potential and current avocado producers how to properly grow the variety of avocados. Clinics should be given by these educated people to teach interested people how to grow the variety of avocados and the benefits of the avocado. As a follow-up to educating growers, the general public of India should be educated as to the benefits of the avocado. This could be in the form of open forum meetings, free classes, and general publicity for the fruit. The follow-up should be a year or so after the avocado crop is increasing and the quality of the fruit is improving. One specialist for the country of India should be implemented in the country for as many years needed till a stable foundation of avocado growing. A specialist could be the main person to help the general growers and public's questions and concerns pertaining to avocados. How can the government pay this for? The government should take action first and ask for other allied countries support as progress is attained. Researchers from other countries should help the cause in India, once some action of trying to encourage progress is taken upon the Indian Government. With this plan in action, India should reap the many benefits of the avocado. Nourished, financially stable and a feeling of self-pride will occur as India is brought to success due to the amazing avocado.

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